

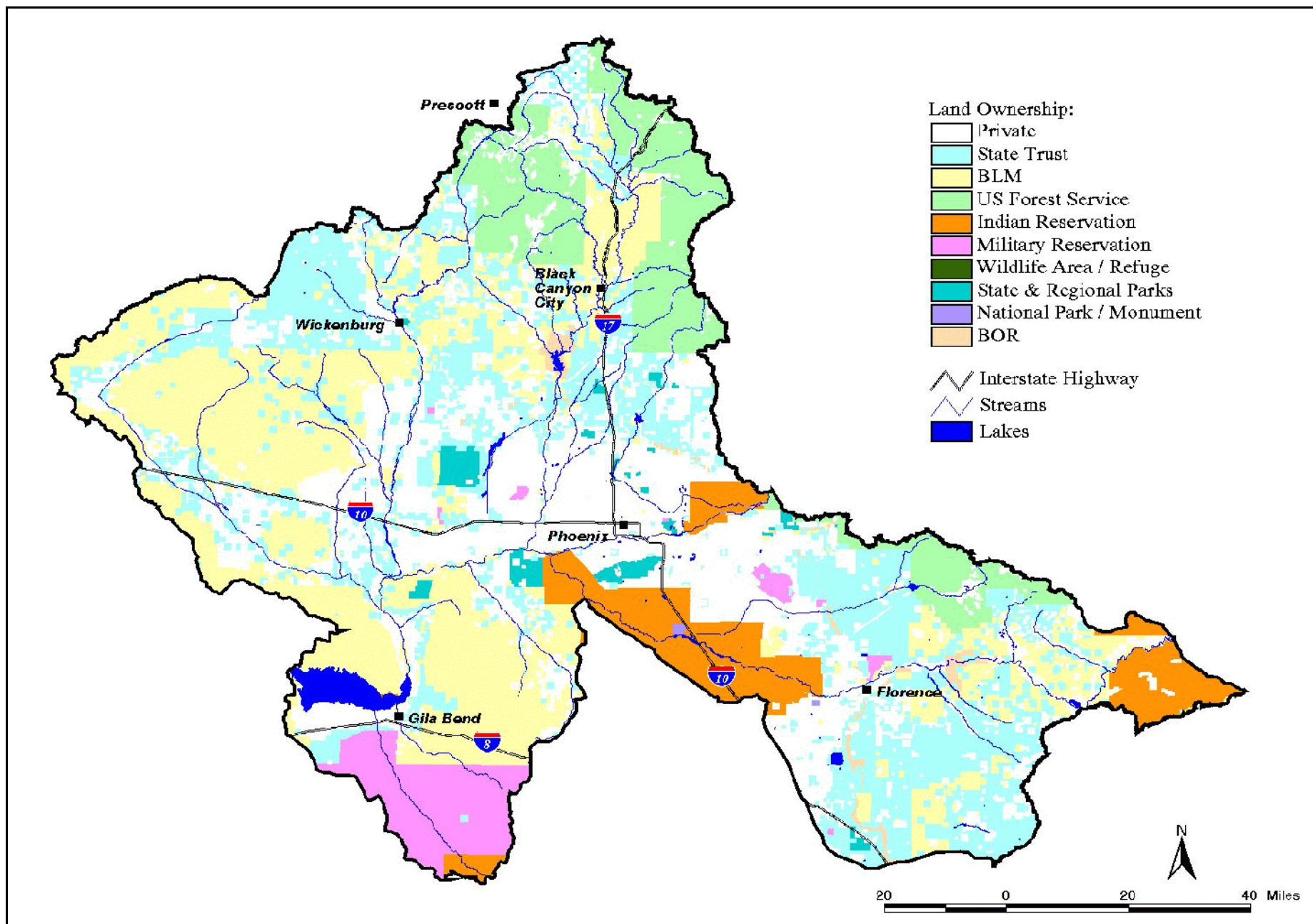
## Middle Gila Watershed



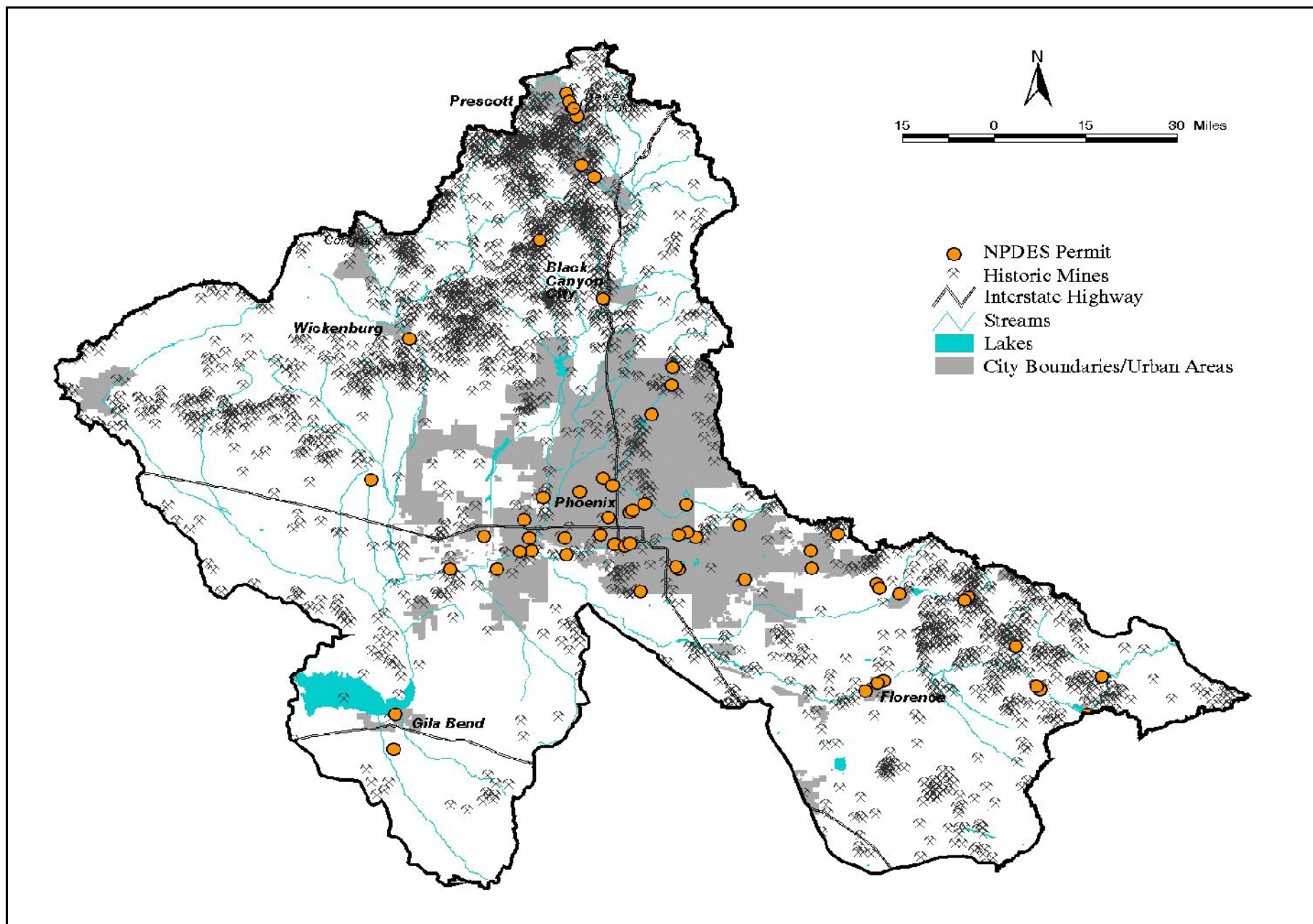
## MIDDLE GILA WATERSHED CHARACTERISTICS

SIZE	12,249 square miles (11% of the state's land area).					
POPULATION BASE	Approximately 3, 190,700 people live in this watershed (estimated from the 2000 census). This is more than 60% of the state's population.					
LAND OWNERSHIP (Figure 27)	Private land	27%	US Forest Service	10%	Other state and federal	4.5%
	Bureau of Land Management	26%	Tribal Land	6%	Military land	3.5%
LAND USES AND PERMITS (Figure 28)	The Phoenix metropolitan area is located in this watershed. Until 20 years ago, irrigated agriculture was the primary land and water use in the greater Phoenix area; however, this use is being displaced by rapid urbanization. Outside the urbanized area, livestock grazing is the primary land use. Abandoned mines occur across this watershed but are more concentrated in the Prescott Mining Area.					
HYDROLOGY AND GEOLOGY	<p>This watershed is defined by the Gila River drainage area below Coolidge Dam (San Carlos Reservoir) in the east to Painted Rock Dam in the west, excluding the Santa Cruz River and San Pedro River drainages and the Salt River above Granite Reef Dam. The Salt River drainage area below Granite Reef Dam is included in this watershed, instead of in the Salt Watershed, because the water in the Salt River normally is diverted at Granite Reef Dam into a system of canals and becomes hydrologically disconnected from its natural fluvial system. Several distinct surface water sub-basins can be identified in this watershed: Gila River, lower Salt River, Agua Fria River, and Hassayampa River. Surface water diversions and ground water pumping for agricultural and urban uses have left stream beds in the Phoenix area dry. The basin receives limited rainfall; therefore, surface water flow in this basin is primarily attributable to occasional releases from upstream impoundments, effluent from wastewater treatment plants, and agricultural return flows (Brown et al. 1978). The flow in the Gila River above Gillespie Dam, near the downstream extent of this watershed, varies from less than 5 cfs (in 1966) to an estimated 130,000 cfs (in 1993) during a major flood event (USGS 1996).</p> <p>Several ground water basins are included in this watershed, including: Agua Fria, Donnelly Wash, Dripping Springs, Gila Bend, Harquahala Valley, McMullen Valley, Phoenix Active Management Area (AMA), Tiger Wash, and Upper Hassayampa basins, along with portions of the Bill Williams and Lower San Pedro basins, Prescott AMA, and Pinal AMA. The main water-bearing unit is the basin-fill deposits which are found in valleys between the mountains. These deposits of gravel, sand, silt, and clay may yield several hundred gallons per minute to wells. In the mountains, small yields of ground water are obtained from thin alluvial deposits and/or fractured bedrock. (ADWR 1994)</p> <p>The Basin and Range is the primary Hydrologic Province, with only a relatively small portion extending into the Central Highlands Province. The Basin and Range area is characterized by gently-sloping alluvial plains, separated by mountain ranges that trend to the north and northwest.</p>					
UNIQUE WATERS	None					
ECOREGIONS	Primarily Southern Basin and Range, with the northeastern edge in the Arizona-New Mexico Mountains.					
OTHER STATES, NATIONS, OR TRIBES	<p>This watershed receives drainage from the upper Gila River, the San Pedro River, the Santa Cruz River, the Salt River, and the Verde River. Theoretically it discharges to the Colorado Lower Gila; however, after the dam and related diversions were constructed at Painted Rocks water has flowed past Painted Rocks Borrow Pit Lake only during a major flood in 1993.</p> <p>Salt River, Fort McDowell, Gila Bend, and Gila River Indian communities are significant stakeholders within this watershed.</p>					





**Figure 27. Land Ownership in the Middle Gila Watershed**



**Figure 28. General Land Use and NPDES Permits in the Middle Gila Watershed**

## Middle Gila Watershed Assessment Discussion

### Statistical Summary of Surface Water Assessments

**Assessments** – For the 2002 assessment, 432 miles of streams, washes or canals, and 2,469 acres of lakes were assessed. Fewer assessment were completed than in previous assessments because of two factors: 1) changes in assessment criteria requiring more data to base an assessment, and 2) a lack of current credible data as this is a focus watershed for monitoring in 2002. The new data will be included in the next assessment cycle.

Water quality assessment information for the Middle Gila Watershed is summarized in the following tables and illustrated on **Figure 29**.

**Table 15. Assessments in the Middle Gila Watershed – 2002**

	STREAMS AND CANALS		LAKES	
	miles	number of segments	acres	number of lakes
ATTAINING	52	2	97	5
INCONCLUSIVE	305	26	2,152	3
IMPAIRED	75	6	0	0
NOT ATTAINING	0	0	220	1
TOTAL ASSESSED	432	34	2,469	9

PERENNIAL SURFACE WATERS ASSESSED		STREAMS AND CANALS		LAKES	
		miles	number of segments	acres	number of lakes
	Assessed	220	21	2,369	8

\* Note that streams with significant perennial stretches within the reach assessed were included in the perennial mileage although part of the reach may have ephemeral or intermittent flow.

insufficient data to determine if a designated use is attaining or impaired, were added to the new Planning List. By the end of the next watershed monitoring cycle (scheduled in 2007), ADEQ expects to monitor most of these reaches so that all designated uses can be assessed during the following assessment cycle. Other lakes and streams which lack any monitoring data will also be monitored as resources and priorities allow.

ADEQ will be working with US Geological Survey, the Arizona Game and Fish Department, and the Salt River Project, so that their future monitoring will better support Arizona's surface water assessments. For example, all of the canals in the Phoenix metropolitan area were assessed as "inconclusive" because only dissolved metals were analyzed while total metal measurements are also needed to complete assessments.

**Major Stressors** – When a surface water is listed as impaired, the pollutants or suspected pollutants causing the impairment are identified. The stream reaches and lakes assessed as impaired can be divided into three groups based on pollutants and their probable sources as follows:

- < Historic mining activities have caused impairment of 70 miles of stream reaches along Mineral Creek, Turkey Creek, Queen Creek, and the Hassayampa River due to metals and related low pH;
- < High levels of boron occur in the Gila River below the Phoenix metropolitan area; and
- < High pH values related to algal blooms were occurring in the newly constructed Tempe Town Lake. Newly initiated treatment of algae appears to also be maintaining the pH within surface water quality standards.

**Inconclusive Assessments** – Surface waters with some monitoring data, but



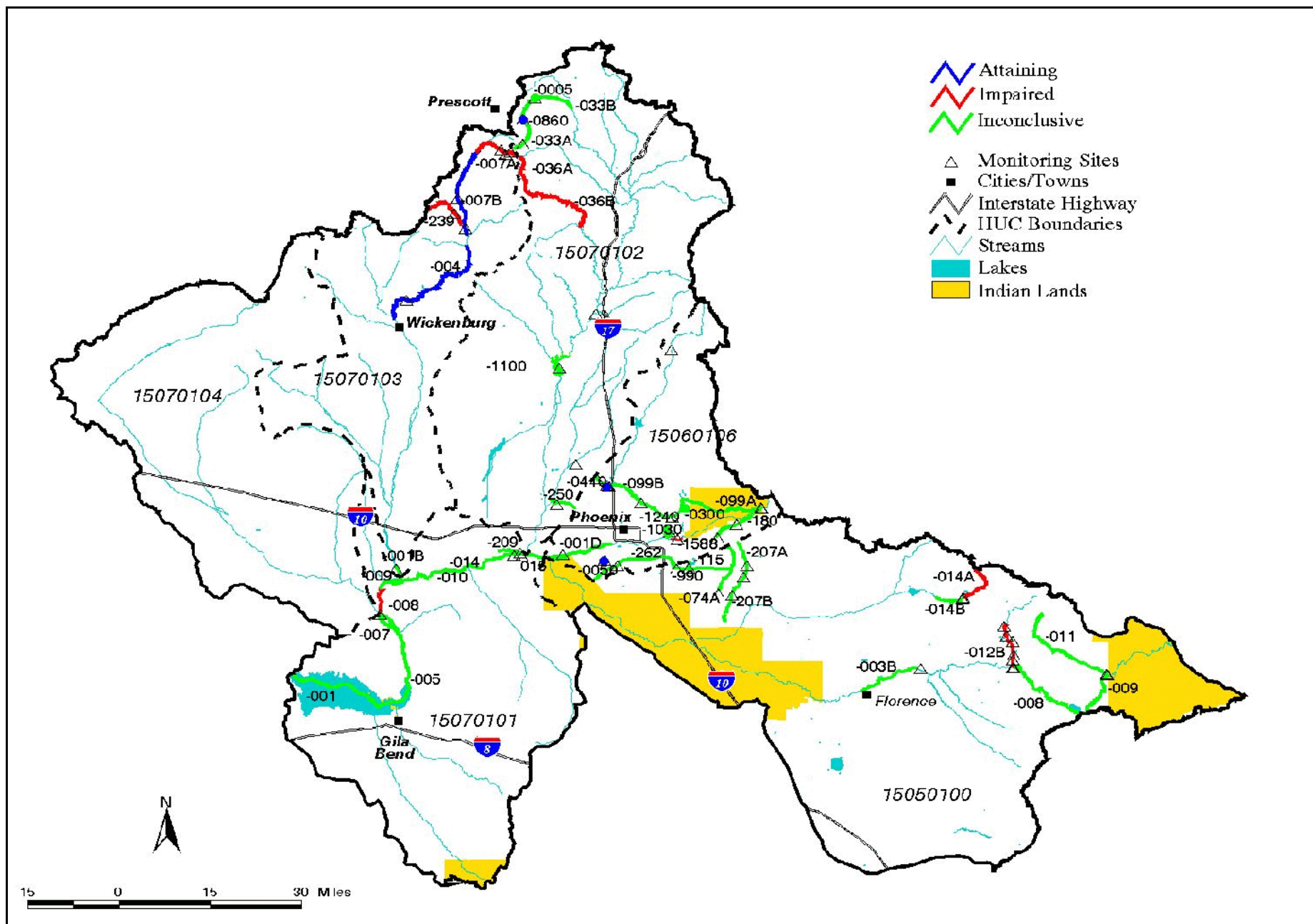


Figure 29. Middle Gila Watershed Surface Water Assessments – 2002

**TABLE 16. MIDDLE GILA WATERSHED -- MONITORING DATA -- 2002 ASSESSMENTS**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	STANDARDS EXCEEDED AT THIS SITE PER SAMPLING EVENT					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
STREAM MONITORING DATA								
Agua Fria River Sycamore Creek-Big Bug AZ15070102-023 A&Ww, FC, FBC, DWS, AgI, AgL	ADEQ Biocriteria Program Above Big Bug Creek MGAFR064.94 100711	1998 - 1 suite	OK					
	Reach Summary Row	1998 1 sampling event	OK				Not assessed	Insufficient data to assess.
Agua Fria River Little Squaw Creek-Cottonwood AZ15070102-017 A&Ww, FC, FBC, DWS, AgI, AgL	USGS Station #09512800 Near Rock Springs MGAFR043.88 100778	1996 - 1 suite	OK					
	Reach Summary Row	1996 1 sampling event	OK				Not assessed	Insufficient data to assess.
Agua Fria River Lake Pleasant-Beardsley AZ15070102-008 A&We, PBC, AgL	USGS Station #09523600 Below Waddell Dam MGAFR030.73 100781	1996 - 1 suite	OK					
	Reach Summary Row	1998 1 sampling event	OK				Not assessed	Insufficient data to assess.
Antelope Creek headwaters-Martinez Creek AZ15070103-010 A&Ww, FC, FBC, AgI, AgL	ADEQ Biocriteria Program Above Road Xing near Stanton MGANT011.29 100713	1998 - 1 suite	OK					
	Reach Summary Row	1998 1 sampling event	OK				Not assessed	Insufficient data to assess.
Arizona Canal Cholla WTP-15070102 begins AZ15060106B-099B AgI, AgL	SRP Routine Monitoring At 75th Avenue & Greenway MGAZC001.48 SVLT 1-20.0	1996 - 10 suites 1997 - 11 suites 1998 - 11 suites, 10 VOCs 1999 - 11 suites, 5 VOCs 2000 - 11 suites, 8 VOCs, 8 pesticides	OK					Missing core parameters: total metals (only dissolved metals reported).
	Reach Summary Row  AgI            Inconclusive AgL            Inconclusive	1996 - 2000  54 sampling events Missing core parameters	OK				Inconclusive	SRP collected 54 samples in 1996 - 2000. Canal assessed as “inconclusive” and added to Planning List due to missing core parameters.

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STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	STANDARDS EXCEEDED AT THIS SITE PER SAMPLING EVENT					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
Arizona Canal Granite Reef Dam-Cholla WTP AZ15060106B-099A DWS, AgI, AgL	SRP Routine Monitoring At Granite Reef SVCA 1-0.0	1996 - 10 suites, 1 VOCs 1997 - 11 suites, 8 VOCs 1998 - 12 suites, 12 VOCs 1999 - 11 suites, 5 VOCs 2000 - 13 suites, 9 VOCs, 9 pesticides	OK					Missing core parameters: total metals including total arsenic and total barium (only dissolved metals reported).
	SRP Routine Monitoring At Invergorden (64th Street) MGAZC014.51 SVCA 1-3.9	1996 - 10 suites, 1 VOCs 1997 - 11 suites, 8 VOCs 1998 - 11 suites, 10 VOCs 1999 - 11 suites, 5 VOCs 2000 - 11 suites, 8 VOCs, 8 pesticides	Boron µg/L	630 (DWS) 1000 (AgI)	560 - 1106 (dissolved)	1 of 54		
	SRP Routine Monitoring At Squaw Peak WTP SVCA 1-9.3	1997 - 13 nutrients, 3 VOCs 1998 - 11 nutrients, 3 VOCs 1999 - 11 nutrients, 2 VOCs 2000 - 11 nutrients, 3 VOCs, 3 pesticides	OK					
	SRP Routine Monitoring At Deer Valley WTP SVCA 1-14.5	1996 - 2 nutrients 1997 - 11 nutrients 1998 - 11 nutrients 1999 - 11 nutrients 2000 - 11 nutrients, 3 VOCs, 3 pesticides	OK					
	SRP Routine Monitoring At Cholla WTP SVCA 1-16.6	1996 - 2 nutrients 1997 - 11 nutrients 1998 - 11 nutrients 1999 - 11 nutrients 2000 - 11 nutrients, 3 VOCs, 3 pesticides	OK					
	<b>Reach Summary Row</b>  DWS      Inconclusive AgI      Inconclusive AgL      Inconclusive	<b>1996 - 2000</b> <b>249 sample events</b> <b>Missing core parameters</b>	Boron µg/L	630 (DWS) 1000 (AgI)	560 - 1106 (dissolved)	1 of 54	Inconclusive	SRP collected a total of 249 samples at five sites in 1996-2000. Canal assessed as "inconclusive" and added to the Planning List due to missing core parameters.
Buckeye Canal 15070101-Hassayampa AZ15070101-209 AgI, AgL	USGS NAWQA Site #09514000 Near Avondale MGBKC000.01	1996 - 4 suites 1997 - 20 suites, VOCs, pesticides 1998 - 10 suites, pesticides	p,p' DDE µg/L	0.001 (AgI, AgL)	0.0087	1 of 1		In 27 other DDE samples, whether or not standards were being met could not be determined because the Laboratory Reporting Limit was higher than the standard. (10 of these included laboratory estimates that exceeded standards.) Missing core parameters: total metals (only dissolved metals reported).



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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	<b>Reach Summary Row</b>  AgI            Inconclusive AgL            Inconclusive	1996 - 1998  34 sampling events Missing core parameters	p,p' DDE µg/L	0.001 (AgI, AgL)	0.0087	1 of 1	Inconclusive	The USGS collected 34 samples in 1996-1998. Canal assessed as "inconclusive" and added to the Planning List due to DDE exceedance and missing core parameters.
Cave Creek headwaters-Cave Creek Dam AZ15060106B-026A A&Ww, FC, FBC, AgL	AGFD Complaint Investigation 4 sites around Silver-X mine MGCVE024.87	1996 - 1 metals, pH	OK					
	<b>Reach Summary Row</b>	1996 1 sampling event	OK				Not assessed	Insufficient data to assess.
Consolidated Canal 15060106B- WTP intake AZ15050100-074A DWS, AgI, AgL	SRP Routine Monitoring At Pecos MGCNC010.03 SVCA 5-14.0	1996 - 12 suites, 3 VOCs 1997 - 11 suites, 9 VOCs 1998 - 11 suites, 10 VOCs 1999 - 12 suites, 6 VOCs 2000 - 12 suites, 9 VOCs, 9 pesticides	OK					Missing core parameters: total metals including total arsenic and total barium (only dissolved metals reported).
	<b>Reach Summary Row</b>  DWS            Inconclusive AgI            Inconclusive AgL            Inconclusive	1996 - 2000  58 sampling events Missing core parameters	OK				Inconclusive	SRP collected 58 samples in 1996 - 2000. Canal assessed as "inconclusive" and added to the Planning List due to missing core parameters.
Crazy Basin Wash headwaters - Poland Wash A&Ww, FBC, FC, AgL	ADEQ TMDL Program French Lily	2001 - 1 metals (no hardness)	OK					
	<b>Reach Summary Row</b>	2000 1 sampling event	OK				Not assessed	Insufficient data to assess.
Devils Canyon headwaters-Mineral Creek AZ15050100-1662 A&Ww, FC, FBC, AgL	ADEQ Biocriteria Program South of Highway 60 MGDVC004.36 100534	1997 - 1 suite	OK					
	<b>Reach Summary Row</b>	1997 1 sampling event	OK				Not assessed	Insufficient data to assess.
Dripping Spring Wash headwaters-Gila River AZ15050100-011 A&Ww, FC, FBC, AgL	AGFD Routine Monitoring At Gila River 3 sites combined MGDSW000.21	1997 - 2 suites 1999 - 1 metals	OK					Missing all core parameters except arsenic & copper. The mercury Laboratory Reporting Limit was not low enough to assess Fish Consumption.

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	<b>Reach Summary Row</b>  A&Ww      Inconclusive FC            Inconclusive FBC            Inconclusive AgL            Inconclusive	1997 - 1999  3 sampling events Missing core parameters	OK				Inconclusive	AGFD collected three samples in 1997-1999. Reach assessed as "inconclusive" and added to the Planning List due to missing core parameters and the Laboratory Reporting limit for mercury.
Eastern Canal WTP below Warner Road-terminus AZ15050100-207B Agl, AgL	SRP Routine Monitoring Lateral 14.2 near Pecos MGESC012.13 SVCA 4-14.2	1996 - 9 suites, 1 VOCs 1997 - 9 suites, 7 VOCs 1998 - 10 suites, 9 VOCs 1999 - 9 suites, 4 VOCs 2000 - 9 suites, 8 VOCs, 8 pesticides	OK					Missing core parameters: total metals (only dissolved metals reported).
	<b>Reach Summary Row</b>  Agl            Inconclusive AgL            Inconclusive	1996 - 2000  56 sampling events Missing core parameters	OK				Inconclusive	SRP collected a total of 56 samples in 1996-2000. Canal assessed as "inconclusive" and added to the Planning List due to missing core parameters.
Eastern Canal University Ave-WTP Warner Rd. AZ15050100-207A DWS, Agl, AgL	SRP Routine Monitoring At Guadalupe (Gilbert WTP) SVCA 4-9.0	1996 - 2 nutrients 1997 - 11 nutrients, 3 VOCs 1998 - 11 nutrients, 3 VOCs 1999 - 12 nutrients, 2 VOCs 2000 -12 nutrients, 3 VOCs, 3 pesticides	OK					Missing core parameters: total metals including total arsenic and total barium (only dissolved metals reported).
	SRP Routine Monitoring At Warner Ave, Tempe MGESC009.15 SVCA 4-11.0	1996 - 12 suites, 3 VOCs 1997 - 11 suites, 9 VOCs 1998 - 11 suites, 11 VOCs 1999 - 11 suites, 6 VOCs 2000 - 11 suites, 8 VOCs, 8 pesticides	OK					
	<b>Reach Summary Row</b>  DWS            Inconclusive Agl            Inconclusive AgL            Inconclusive	1996 - 2000  104 samples 60 sampling events Missing core parameters	OK				Inconclusive	SRP collected 48 samples in 1996 - 2000. Canal assessed as "inconclusive" and added to the Planning List due to missing core parameters.

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
French Gulch headwaters-Hassayampa River AZ15070102-239 A&Ww, FBC, FC, AgI, AgL	Arimetco, Inc. Compliance monitoring Above Zonia Gulch (& mine) (MGFRE-AZG)	1996 - 20 suites 1997 - 10 suites 1998 - 9 suites 1999 - 9 suites 2000 - 10 suites	Arsenic (total) µg/L	50 (FBC)	<5 - 74	1 of 59		Missing core parameters: dissolved oxygen, bacteria, boron, and dissolved cadmium, chromium, and lead.  133 beryllium samples were not included because the Laboratory Reporting Limit was too high to assess Fish Consumption.
			Beryllium (total) µg/L	0.21 (FC)	0.03 - 2.0	1 of 5		
			Copper (dissolved) µg/L	varies (65) (A&Ww)	<10 - 300	31 of 56		
			Manganese (total) µg/L	10,000 (AgI)	380 - 52,000	55 of 59		
				19,600 (FBC)		53 of 59		
			Mercury (total) µg/L	0.6 (FC)	0.2 - 1.7	2 of 59		
			Zinc (dissolved) µg/L	varies (379) (A&Ww)	80 - 1100	20 of 56		
	Arimetco, Inc. Compliance monitoring Below Zonia Gulch (MGFRE-BZG)	1996 - 20 suites 1997 - 10 suites 1998 - 10 suites 1999 - 9 suites 2000 - 10 suites	Arsenic (total) µg/L	50 (FBC)	<5 - 94	1 of 58		Missing core parameters: dissolved oxygen, bacteria, boron, and dissolved cadmium, chromium, and lead.
			Copper (dissolved) µg/L	varies (65) (A&Ww)	<10 - 1200	49 of 55		
			Copper (total) µg/L	500 (AgL)	14 - 1400	29 of 58		
			Manganese (total) µg/L	10,000 (AgI)	190 - 47,700	54 of 58		
				19,600 (FBC)		33 of 48		
			Mercury (total) µg/L	0.6 (FC)	<0.2 - 1.1	1 of 58		
			Zinc (dissolved) µg/L	varies (379) (A&Ww)	40 - 2260	46 of 55		
	Arimetco, Inc. Compliance monitoring Above Placerita Gulch (MGFRE-APG)	1996 - 2 suites 1997 - 2 suites 1998 - 2 suites 1999 - 2 suites 2000 - 3 suites	Manganese (total) µg/L	10,000 (AgI)	<10 - 18,600	1 of 11		Missing core parameters: dissolved oxygen, bacteria, boron, and dissolved cadmium, chromium, and lead.
			Mercury (total) µg/L	0.6 (FC)	<0.2 - 1.7	1 of 11		
	Arimetco, Inc. Compliance monitoring Below Placerita Gulch (MGFRE-BPG)	1996 - 3 suites 1997 - 2 suites 1998 - 2 suites 1999 - 3 suites 2000 - 3 suites	Mercury (total) µg/L	0.6 (FC)	<0.2 - 1.9	1 of 12		Missing core parameters: dissolved oxygen, bacteria, boron, and dissolved cadmium, chromium, and lead.

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	Reach Summary Row	1996 - 2000 140 samples 60 sampling events Missing core parameters	Arsenic (total) µg/L	50 (FBC)	<5 - 94	2 of 140	Attaining	Arimetco collected a total of 140 samples at 4 sampling sites in 1996-2000. Reach is assessed as impaired due to copper, manganese and zinc. Add to Planning List due to beryllium exceeding standards and missing core parameters.
	A&Ww		Beryllium (total) µg/L	0.21 (FC)	0.03 - 2.0	1 of 7	Inconclusive	
	FC		Copper (dissolved) µg/L	varies (65) (A&Ww)	<10 - 1200	80 of 135	Impaired	
	FBC		Copper (total) µg/L	500 (AgL)	14 - 1400	29 of 140	Impaired	
	AgI		Manganese (total) µg/L	10,000 (AgI)	190 - 52,000	110 of 140	Impaired	
	AgL			19,600 (FBC)		96 of 140	Impaired	
			Mercury (total) µg/L	0.6 (FC)	<0.2 - 1.9	5 of 140	Attaining	
			Zinc (dissolved) µg/L	varies (379) (A&Ww)	40 - 2260	66 of 135	Impaired	
Gila River Dripping Spring-San Pedro River AZ15050100-009 A&Ww, FC, FBC, AgL	AGFD Special Investigation Below Dripping Spring MGGLR146.49	1997 - 2 suites	OK					Missing core parameters: turbidity, bacteria, boron, and metals. Also, the mercury Laboratory Reporting Limit was too high to assess Fish Consumption.
	Reach Summary Row	1997	OK				Inconclusive	AGFD collected two samples in 1997. Reach assessed as "inconclusive" and added to Planning List due to missing core parameters, lack of sampling events, and the high laboratory reporting limit for mercury.
Gila River, San Pedro-Mineral Creek AZ15050100-008 A&Ww, FC, FBC, AgI, AgL	USGS NAWQA Site #09474000 At Kelvin MGGLR136.90	1996 - 8 suites 1997 - 12 suites 1998 - 6 suites	OK					Missing core parameters: turbidity, bacteria, boron, and insufficient metals.
	AGFD Special Investigation Above Mineral Creek MGGLR136.98	1997 - 2 suites	OK					Missing core parameters: turbidity, bacteria, boron, and insufficient metals. The Laboratory Reporting Limit for mercury was too high to assess Fish Consumption use.



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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	<b>Reach Summary Row</b>  <b>A&amp;Ww</b> <b>Inconclusive</b> <b>FC</b> <b>Inconclusive</b> <b>FBC</b> <b>Inconclusive</b>  <b>AgI</b> <b>Inconclusive</b> <b>AgL</b> <b>Inconclusive</b>	1996 - 1998  28 sampling events Missing core parameters	OK				Inconclusive	USGS collected 26 samples in 1996-1998. AGFD collected 2 samples in 1997. Reach assessed as "inconclusive" and added to the Planning List due to missing core parameters and high laboratory reporting limit for mercury.
Gila River Ashurst-Hayden-Florence WWTP AZ15050100-003B A&We, PBC, AgL	AGFD Special Investigation At Ashurst-Hayden Dam MGGLR127.23	1997 - 2 suites	Copper (total) µg/L	500 (AgL)	<50 - 710	1 of 2		Missing core parameters: turbidity, bacteria, boron, insufficient metals.
	<b>Reach Summary Row</b>  <b>A&amp;We</b> <b>Inconclusive</b> <b>PBC</b> <b>Inconclusive</b> <b>AgL</b> <b>Inconclusive</b>	1997  2 sampling events Missing core parameters	Copper (total) µg/L	500 (AgL)	<50 - 710	1 of 2	Inconclusive	AGFD collected two samples in 1997. Reach assessed as "inconclusive" and added to the Planning List due to copper exceeding a standard, insufficient sampling events, and missing core parameters.
Gila River Agua Fria River-Waterman Wash AZ15070101-014 A&Wedw, FC, PBC, AgI, AgL	USGS NAWQA Site #09514100 At Estrella Parkway MGGLR093.63	1998 - 1 suite, pesticide	OK					Missing core parameters: turbidity, metals, bacteria, boron
	USGS NAWQA Site #09513990 Above Head of Buckeye Canal MGGLR094.27	1996 - 6 suites, pesticides	OK					Missing core parameters: turbidity, metals, bacteria, boron
	<b>Reach Summary Row</b>  <b>A&amp;Wedw</b> <b>Inconclusive</b> <b>FC</b> <b>Inconclusive</b>  <b>PBC</b> <b>Inconclusive</b> <b>AgI</b> <b>Inconclusive</b> <b>AgL</b> <b>Inconclusive</b>	1996 - 1998 7 sampling events Missing core parameters	OK				Inconclusive	USGS collected a total of 7 samples at two sites in 1996-1998. Reach is assessed as "inconclusive" and added to Planning List due to missing core parameters.
Gila River Centennial Wash-Gillespie Dam AZ15070101-008 A&Wedw, FC, PBC, AgI, AgL	USGS Station #09518000 Above Gillespie Dam MGGLR075.86 100734	1996 - 6 suites 1997 - 6 suites 1998 - 5 suites 1999 - 4 suites 2000 - 4 suites	Boron (total) µg/L	1000 (AgI)	375 - 2235	16 of 21		
			Beryllium (total) µg/L	0.21 (FC)	<0.1 - 0.6	4 of 11		12 other beryllium samples were not counted because the Laboratory Reporting Limit for beryllium was too high to assess Fish Consumption.
			Fecal coliform CFU	800 (A&Wedw)	30 - 2400	3 of 22		

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
			Mercury (total) µg/L	0.6 (FC)	<0.1 - 1.1	1 of 25		
			Selenium (total) µg/L	20 (Agl)	<0.1 - 33.8	3 of 22		
			Turbidity NTU	50 (A&Wedw)	0.34 - 95.0	3 of 25		
	<b>Reach Summary Row</b>  A&Wedw    Attaining FC           Inconclusive PBC         Attaining Agl          Impaired AgL                    Attai ning	<b>1996 - 2000</b> <b>25 sampling events</b>	Boron (total) µg/L	1000 (Agl)	375 - 2235	16 of 21	Impaired	USGS collected 25 samples in 1996-2000. Reach is assessed as impaired due to boron. Also, added reach to Planning List due to beryllium exceeding standards.
			Beryllium (total) µg/L	0.21 (FC)	<0.1 - 0.6	4 of 11	Inconclusive	
			Fecal coliform CFU	800 (A&Wedw)	30 - 2400	3 of 22 (over 4 years)	Attaining	
			Mercury (total) µg/L	0.6 (FC)	<0.1 - 1.1	1 of 25	Attaining	
			Selenium (total) µg/L	20 (Agl)	<0.1 - 33.8	3 of 22	Attaining	
			Turbidity NTU	50 (A&Wedw)	0.34 - 95.0	3 of 25	Attaining	
Grand Canal 15070101-New River AZ15070102-250 Agl, AgL	SRP/USGS Routine Monitoring At 99th Ave, Phoenix SVLT 2-23-0 MGGR000.70	1996 - 10 suites 1997 - 12 suites 1998 - 11 suites 1999 - 11 suites 2000 - 11 suites	OK					Missing core parameters: no total metals (only dissolved metals reported).
	<b>Reach Summary Row</b>  Agl           Inconclusive AgL                    Inco nclu sive	<b>1996 - 2000</b> <b>55 samples</b> <b>Missing core parameters</b>	OK				Inconclusive	SRP collected 55 samples in 1996-2000. Canal assessed as "inconclusive" due to missing core parameters (total metals).
Hassayampa River headwaters-Copper Creek AZ15070103-007A A&Ww, FC, FBC, Agl, AgL	ADEQ TMDL Program At Babble MGHSR110.65 100942	2000 - 1 field, metals	Copper (dissolved) µg/L	varied hardness (A&Ww)	43	1 of 1		
			Zinc (dissolved) µg/l	varied hardness (A&Ww)	380	1 of 1		
	ADEQ TMDL Program Below Senator Mine MGHSR109.68 101036	2000 - 1 metal, nutrient	Zinc (dissolved) µg/L	varied hardness (A&Ww)	770	1 of 1		

**TABLE 16. MIDDLE GILA WATERSHED -- MONITORING DATA -- 2002 ASSESSMENTS**

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	ADEQ TMDL Program At Whispering Pines MGHSR108.17 100941	2000 - 1 field, metal	Dissolved oxygen mg/L	6.0 (90% saturation) (A&Ww)	5.05	1 of 1		Field staff documented that naturally occurring ground water upwelling rather than any anthropogenic activities caused the low dissolved oxygen; therefore, not considered in the final assessment.
			Zinc (dissolved) µg/L	varied hardness (A&Ww)	510	1 of 1		
	Reach Summary Row	1996 - 2000	Copper (dissolved) µg/L	varied hardness (A&Ww)	13 - 43	1 of 3	Inconclusive	ADEQ collected a total of 3 samples from 3 sites in 2000. Reach is assessed as "impaired" due to zinc. Add to Planning List due to copper exceedance, missing core parameters, and lack of sampling events.
	A&Ww FC FBC AgI  AgL	3 samples 2 sampling events Missing core parameters	Zinc (dissolved) µg/L	varied hardness (A&Ww)	380 - 770	3 of 3	Impaired	
Hassayampa River Copper Creek-Blind Indian AZ15070103-007B A&Ww, FC, FBC, AgI, AgL	ADEQ TMDL Program At gaging station MGHSR089.37 100940	2000 - 1 field, 1 metal	OK					
	ADEQ Fixed Station Network Near Wagoner, below Milk Creek MGHSR063.02 100464	1996 - 5 suites 1999 - 3 suites 2000 - 4 suites	Arsenic (total) µg/L	50 (FBC)	<10 - 67	1 of 12		11 other beryllium samples were not included because the Laboratory Reporting Limit was not low enough to assess Fish Consumption.
			Beryllium (total) µg/L	0.21 (FC)	16	1 of 1		
			Beryllium (total) µg/L	4 (FBC)	<0.5 - 16	1 of 12		
			Copper (total) µg/L	500 (AgL)	<10 - 1100	1 of 12		
			Dissolved oxygen mg/L	6.0 (90% saturation) (A&Ww)	2.64 - 8.16	6 of 12		Field staff documented that naturally occurring ground water upwelling rather than any anthropogenic activities caused the low dissolved oxygen; therefore, not considered in the final assessment.
			Fecal coliform CFU/100 ml	4000 (A&Ww, AgI, AgL)	0 - 6400	1 of 8		
			Lead (total) µg/L	100 (AgL)	<5 - 150	1 of 12		
			Turbidity NTU	50 (A&Ww)	0.8 - 1000	1 of 11		

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STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	STANDARDS EXCEEDED AT THIS SITE PER SAMPLING EVENT					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	Reach Summary Row	1996 - 2000 13 samples	Arsenic (total) µg/L	50 (FBC)	<10 - 67	1 of 12	Attaining	ADEQ collected a total of 13 samples from 2 sites in 1996, 1999-2000. Reach assessed as "attaining some uses." Add to Planning List due to fecal coliform and beryllium exceeding standards.
	A&Ww	Inconclusive	Beryllium (total) µg/L	0.21 (FC)	16	1 of 1	Inconclusive	
	FC	Attaining	Beryllium (total) µg/L	4 (FBC)	<0.5 - 16	1 of 12	Attaining	
	FBC	Attaining	Copper (total) µg/L	500 (AgL)	<10 - 1100	1 of 13	Attaining	
	AgI	Inconclusive	Fecal coliform CFU/100 ml	4000 (A&Ww, AgI, AgL)	0 - 6400	1 of 8	Inconclusive	
	AgL	Inconclusive	Lead (total) µg/L	100 (AgL)	<5 - 150	1 of 12	Attaining	
			Turbidity NTU	50 (A&Ww)	0.8 - 1000	1 of 12	Attaining	
Hassayampa River Cottonwood Creek-Martinez AZ15070103-004 A&Ww, FC, FBC, AgI, AgL	ADEQ Fixed Station Network At Box Canyon Dam MGHSR049.89 100463	1999 - 3 suites 2000 - 4 suites	Arsenic (total) µg/L	50 (FBC)	<10 - 53	1 of 7		Seven other beryllium samples were not included because the Laboratory Reporting Limit for beryllium was too high to assess Fish Consumption.
			Beryllium (total) µg/L	0.21 (FC)	3.7 - 13	2 of 2		
			Beryllium (total) µg/L	4 (FBC)	<0.5 - 13	1 of 7		
			Copper (total) µg/L	500 (AgL)	<10 - 610	1 of 7		
			Escherichia coli CFU/100 ml	580 (FBC)	2 - 11400	1 of 6		
			Lead (total) µg/L	100 (AgL)	<5 - 170	1 of 7		
			Turbidity NTU	50 (A&Ww)	0.8 - >1000	2 of 7		
	Reach Summary Row	1999 - 2000 7 samples	Arsenic (total) µg/L	50 (FBC)	<10 - 53	1 of 7	Inconclusive	USGS collected 7 samples in 1999-2000. Reach assessed as "attaining some uses." Add to Planning List due to arsenic, beryllium, copper, E. coli, lead, and turbidity exceeding standards.
	A&Ww	Inconclusive	Beryllium (total) µg/L	0.21 (FC)	3.7 - 13	2 of 2	Inconclusive	
	FC	Inconclusive	Beryllium (total) µg/L	4 (FBC)	<0.5 - 13	1 of 7	Inconclusive	
	AgI	Attaining						
	AgL	Inconclusive						



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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
			Copper (total) µg/L	500 (AgL)	<10 - 610	1 of 7	Inconclusive	
			Escherichia coli CFU/100 ml	580 (FBC)	2 - 11400	1 of 6	Inconclusive	
			Lead (total) µg/L	100 (AgL)	<5 - 170	1 of 7	Inconclusive	
			Turbidity NTU	50 (A&Ww)	0.8 - >1000	2 of 7	Inconclusive	
Hassayampa River Buckeye Canal - Gila River AZ15070103-001B A&Ww, FC, FBC, AgL	USGS NAWQA Site #09517000 Below Buckeye Canal near Arlington MGHSR001.56	1996 - 8 suites, pesticides 1997 - 29 suites, pesticides 1998 - 11 suites, pesticides	DDE µg/L	0.001 (AgL) 0.0006 (FC)	0.0061 - 0.012	10 of 10		In 30 other DDE samples, whether or not standards were being met could not be determined because the Laboratory Reporting Limit was higher than the standard. (In 23 of these, laboratory estimates of the results exceeded standards.) Missing core parameters: no turbidity, bacteria, insufficient metals
			Ammonia mg/L	varies (A&Ww)	0.03 - 11.0	2 of 48		Standard varies dependent on pH and temperature.
	<b>Reach Summary Row</b>  A&Ww      Inconclusive FC          Inconclusive FBC        Inconclusive AgL                      Inconclusive	<b>1996 - 1998</b> <b>48 samples</b> <b>Missing core parameters</b>	p,p' DDE µg/L	0.001 (AgL) 0.0006 (FC)	0.0061 - 0.012	10 of 10	Inconclusive (see comment)	USGS collected 48 samples in 1996-1998. Reach assessed as "inconclusive" and added to the Planning List due to DDE exceeding standards and missing core parameters.
			Ammonia mg/L	varies (A&Ww)	0.03 - 11.0	2 of 48	Attaining	
Little Ash Creek headwaters-Ash Creek AZ15070102-039 A&Ww, FC, FBC, AgL	ADEQ Biocriteria Program Near Estler Peak MGLAS003.16 100578	1998 - 1 suite	OK					
	<b>Reach Summary Row</b>	<b>1998</b> <b>1 sampling event</b>	<b>OK</b>				<b>Not assessed</b>	<b>Insufficient data to assess. Not enough sampling events.</b>
Lynx Creek headwaters-Agua Fria River AZ15070102-033 A&Ww, FC, FBC, AgL	AGFD Routine Monitoring MGLNX008.50	1998 - 1 metals only 1 field + nutrients + NH3	Cadmium (total) µg/L	41 (FC) 70 (FBC) 50 (AgL)	104	1 of 1		
			Copper (total) µg/L	500 (AgL)	1580	1 of 1		

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STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	STANDARDS EXCEEDED AT THIS SITE PER SAMPLING EVENT					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	Reach Summary Row	1998	Cadmium (total) µg/L	41 (FC) 70 (FBC) 50 (AgL)	104	1 of 1	Inconclusive	AGFD collected two samples in 1998. Reach assessed as "inconclusive" and should be added to the Planning List due to cadmium and copper exceeding standards, lack of monitoring events, and missing core parameters.
	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	2 sampling events  Missing core parameters	Copper (total) µg/L	500 (AgL)	1580	1 of 1	Inconclusive	
Mineral Creek Devils Canyon-Gila River AZ15050100-012B A&Ww, FC, FBC, AgL	ASARCO Permit Monitoring At Indian Gardens (above mine) (Surf 1) MGMIN007.55	1997 - 1 suite 1998 - 12 suites 1999 - 12 suites 2000 - 12 suites	Beryllium (total) µg/L	0.21 (FC)	<0.2 - 1.0	2 of 37		Missing core parameter: bacteria.
			Dissolved oxygen mg/L	6.0 (90% saturation) (A&Ww)	3.5 - 17.5	11 of 32		Field staff documented that naturally occurring ground water upwelling rather than any anthropogenic activities caused the low dissolved oxygen; therefore, not considered in the final assessment.
			Turbidity NTU	50 (A&Ww)	0.5 - 960	3 of 37		Missing core parameter: bacteria.
	ASARCO Permit Monitoring Mineral Creek Diversion Tunnel Inlet MGMIN005.77	1998 - 10 suites 1999 - 12 suites 2000 - 12 suites	Beryllium (total) µg/L	0.21 (FC)	<0.2 - 47.0	23 of 34		Missing core parameter: bacteria.
			Beryllium (total) µg/L	4 (FBC)	<0.2 - 47.0	7 of 34		
			Cadmium (dis.) µg/L	varied hardness (A&Ww)	<0.5 - 520	2 of 34		
			Cadmium(total) µg/L	41 (FC) 50 (AgL) 70 (FBC)	<0.5 - 550	6 of 34 5 of 34 5 of 34		
			Chromium VI µg/L	16 (A&Ww)	<10 - 20	1 of 34		
			Copper (dissolved) µg/L	varied hardness (A&Ww)	<20 - 19000	20 of 34		
			Copper (dissolved) µg/L	5200 (FBC)	<20 - 19000	2 of 34		
			Copper (total) µg/L	500 (AgL)	<20 - 20000	9 of 34		

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
			Dissolved oxygen mg/L	6.0 (90% saturation) (A&Ww)	2.23 - 18.27	17 of 31		Field staff documented that naturally occurring ground water upwelling rather than any anthropogenic activities caused the low dissolved oxygen; therefore, not considered in the final assessment.
			Fluoride µg/L	8400 (FBC)	200 -23000	2 of 32		Missing core parameter: bacteria.
			Nickel (total) µg/L	730 (FC)	<50 - 2000	2 of 34		
			pH (low) SU	6.5 - 9.0 (A&W, FBC, AgL)	4.5 - 7.9	10 of 33		
			Turbidity NTU	50 (A&Ww)	0.4 - 560	4 of 34		
			Zinc (dissolved) µg/L	varied hardness (A&Ww))	<40 - 28000	22 of 34		
			Zinc (total) µg/L	22000 (FC) 25000 (AgL)	<40 - 28000	2 of 34 1 of 34		
	ASARCO Permit Monitoring Mineral Creek Diversion Tunnel Outlet (Surf 3) MGMIN004.74	1996 - 10 suites 1997 - 7 suites 1998 - 12 suites 1999 - 12 suites 2000 - 12 suites	Beryllium (total) µg/L	0.21 (FC)	<0.2 - 3.4	16 of 53		Missing core parameter: bacteria.
			Copper (dissolved) µg/L	varied hardness (A&Ww)	<2 - 180	10 of 53		
			Copper (total) µg/L	500 (AgL)	<20 - 2000	4 of 53		
			Dissolved oxygen mg/L	6.0 (90% saturation) (A&Ww)	4.42 - 17.39	9 of 32		Field staff documented that naturally occurring ground water upwelling rather than any anthropogenic activities caused the low dissolved oxygen; therefore, not considered in the final assessment.
			Turbidity NTU	50 (A&Ww)	0.3 - 535	3 of 53		Missing core parameter: bacteria.
			Sulfide µg/L	100 (A&Ww)	<100 - 400	1 of 17		
			Zinc (dissolved) µg/L	varied hardness (A&Ww)	<40 - 430	2 of 53		

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STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	STANDARDS EXCEEDED AT THIS SITE PER SAMPLING EVENT					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	ASARCO Permit Monitoring RCC Channel Tunnel Outlet (Surf 8) MGMIN002.21	1998 - 8 suites 1999 - 4 suites 2000 - 1 suites	Beryllium (total) µg/L	0.21 (FC)	<0.2 - 3.4	5 of 13		Missing core parameter: bacteria.
			Copper (dissolved) µg/L	varied hardness (A&Ww)	27 - 1400	11 of 13		
			Copper (total) µg/L	500 (AgL)	33 - 1600	5 of 13		
			Turbidity NTU	50 (A&Ww)	1.25 - 508	2 of 13		
			Zinc (dissolved) µg/L	varies (A&Ww)	<40 - 430	1 of 13		
	ASARCO Permit Monitoring Below highway bridge 177 (Surf 10) MGMIN001.35	1996 - 8 suites 1997 - 8 suites 1998 - 8 suites 1999 - 4 suites 2000 - 6 suites	Beryllium (total) µg/L	0.21 (FC)	<0.2 - 1.0	21 of 31		Missing core parameter: bacteria.
			Cadmium (total) µg/L	41 (FC) 50 (AgL) 70 (FBC)	<0.5 - 82	2 of 33 2 of 33 1 of 33		
			Copper (dissolved) µg/L	varied hardness (A&Ww)	<20 - 48000	24 of 32		
			Copper (dissolved) µg/L	5200 (FBC)	<20 - 48000	1 of 32		
			Copper (total) µg/L	500 (AgL)	<20 - 51000	14 of 33		
			Dissolved oxygen mg/L	6.0 (90% saturation) (A&Ww)	4.49 - 9.6	1 of 17		Field staff documented that naturally occurring ground water upwelling rather than any anthropogenic activities caused the low dissolved oxygen; therefore, not considered in the final assessment.
			pH (low) SU	6.5 - 9.0 (A&Ww, FBC, AgL)	4.41 - 8.83	1 of 19		Missing core parameter: bacteria.
			Turbidity NTU	50 (A&Ww)	0.16 - 515	5 of 32		
			Zinc (dissolved) µg/L	varied hardness (A&Ww)	<40 - 3500	11 of 32		
	AGFD Special Investigation State route 177 Bridge	2000 - 1 suites	OK					Missing core parameters.



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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	Reach Summary Row	1996 - 2000	Beryllium (total) µg/L	0.21 (FC)	<0.2 - 47.0	67 of 169	Impaired	ASARCO collected a total of 170 samples from five sites in 1996-2000. AGFD collected 1 sample in 2000. Mineral Creek is assessed as "impaired" due to beryllium, copper, and zinc. At the tunnel inlet site, Mineral Creek is also impaired by low pH.
	A&Ww Impaired	171 samples	Beryllium (total) µg/L	4 (FBC)	<0.2 - 47.0	7 of 169	Attaining	
	FC Impaired	54 sampling events	Cadmium (dissolved) µg/L	varied hardness (A&Ww)	<0.5 - 520	2 of 169	Attaining	
	FBC Inconclusive	Missing core parameters	Cadmium (total) µg/L	41 (FC) 50 (AgL)	<0.5 - 550	8 of 169	Attaining	
	AgL Impaired		Cadmium (total) µg/L	70 (FBC)	<0.5 - 550	6 of 169	Attaining	
			Chromium VI µg/L	16 (A&Ww)	<10 - 20	1 of 137	Attaining	
			Copper (dissolved) µg/L	varied hardness (A&Ww)	<20 - 48000	65 of 170	Impaired	
			Copper (dissolved) µg/L	5200 (FBC)	<20 - 48000	1 of 170	Attaining	
			Copper (total) µg/L	500 (AgL)	<20 - 51000	32 of 170	Impaired	
			Fluoride µg/L	8400 (FBC)	200 - 23000	2 of 158	Attaining	
			Nickel (total) µg/L	730 (FC)	<50 - 2000	2 of 160	Attaining	
			pH (low) SU	6.5 - 9.0 (A&Ww, FBC, AgL)	4.41 - 8.83	11 of 154 10 of 33 at tunnel inlet	Impaired (at tunnel inlet)	
			Turbidity NTU	50 (A&Ww)	0.16 - 960	17 of 169	Attaining	
			Zinc (dissolved) µg/L	varied hardness (A&Ww)	<40 - 28000	36 of 170	Impaired	
			Zinc (total) µg/L	22000 (FC)	<40 - 28000	2 of 170	Attaining	
			Zinc (total) µg/L	25000 (AgL)	<40 - 28000	1 of 170	Attaining	

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
New River headwaters-Interstate 17 AZ15070102-006A A&Ww, FC, FBC, AgI, AgL	ADEQ Biocriteria Program Above Burnt Hole Canyon MGNWR040.70 100604	1998 - 1 suites	OK					
	<b>Reach Summary Row</b>	<b>1998 1 sampling event</b>	<b>OK</b>				<b>Not assessed</b>	<b>Insufficient data to assess. Not enough sampling events.</b>
Queen Creek headwaters-Superior Mine WWTP AZ15050100-014A A&Ww, FC, PBC, DWS, AgL	BHP NPDES Permit monitoring Above mine discharge AMP1	1997 - 2 field, metals 1998 - 3 field, metals	Copper (dissolved) µg/L	varied hardness (A&Ww)	17 - 31	2 of 5		Missing core parameters: dissolved oxygen, turbidity, bacteria, nitrate/nitrite, fluoride, barium, and boron
	<b>Reach Summary Row</b>  A&Ww Impaired FC Attaining PBC Inconclusive  DWS Inconclusive  AgL Attaining	<b>1997- 1998</b>  <b>5 sampling events</b> <b>Missing core parameters</b>	<b>Copper (dissolved) µg/L</b>	<b>varied hardness (A&amp;Ww)</b>	<b>17 - 31</b>	<b>2 of 5 (2 within 2 years)</b>	<b>Impaired</b>	<b>BHP collected 5 samples in 1997-1998. Reach assessed as "impaired" due to dissolved copper. Also added to the Planning List due to missing core parameters.</b>
Queen Creek Superior Mining WWTP-Potts Cyn AZ15050100-014B A&Wedw, PBC	BHP NPDES Permit monitoring Below mine discharge AMP2	1997 - 2 field, metals 1998 - 3 field, metals	OK					Missing core parameters: dissolved oxygen, bacteria, and turbidity.
	<b>Reach Summary Row</b>  A&Wedw Inconclusive PBC Inconclusive	<b>1997 - 1998</b>  <b>5 sampling events</b> <b>Missing core parameters</b>	<b>OK</b>				<b>Inconclusive</b>	<b>BHP collected 5 samples in 1997-1998. Reach assessed as "inconclusive" and added to the Planning List due to missing core parameters.</b>
Salt River 23rd Ave WWTP-Gila River AZ15060106B-001D A&Wedw, FC, PBC, AgI, AgL	USGS NAWQA Site #09512407 91st Avenue WWTP Outfall MGSLR010.78	1996 - 10 suites, 1997 - 12 suites, 5 VOCs 1998 - 2 suites	OK					Missing core parameters: turbidity, bacteria, boron, mercury, insufficient metals except manganese.
	<b>Reach Summary Row</b>  A&Wedw Inconclusive FC Inconclusive PBC Inconclusive AgI Inconclusive  AgL Inconclusive	<b>1996 - 1998</b>  <b>24 sampling events</b> <b>Missing core parameters</b>	<b>OK</b>				<b>Inconclusive</b>	<b>USGS collected 24 samples in 1996-1998. Reach assessed as "inconclusive" and added to the Planning List due to missing core parameters.</b>

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
South Canal Granite Reef Dam-Consolidated Canal AZ15060106B-180 DWS, Agl, AgL	SRP Routine Monitoring At Granite Reef MGSOC000.05 SVCA 3-0.0	1996 - 12 suites, 3 VOCs 1997 - 11 suites, 9 VOCs 1998 - 12 suites, 12 VOCs 1999 - 11 suites, 5 VOCs 2000 - 13 suites, 9 VOCs, 9 pesticides	OK					Missing core parameters: total metals
	SRP Routine Monitoring At Val Vista Plant SVCA 3-1.4	1996 - 2 nutrients 1997 - 13 nutrients, 2 inorganics, 3 VOCs 1998 - 11 nutrients, 3 VOCs 1999 - 11 nutrients, 1 VOCs 2000 - 12 nutrients, 3 VOCs, 3 pesticides	OK					
	SRP Routine Monitoring At Division Gates Near Brown MGSOC006.83 SVCA 3-3.3	1996 - 12 suites, 3 VOCs 1997 - 11 suites, 9 VOCs 1998 - 11 suites, 11 VOCs 1999 - 10 suites, 4 VOCs 2000 - 12 suites, 9 VOCs, 9 pesticides	OK					
	<b>Reach Summary Row</b>  DWS            Inconclusive Agl            Inconclusive AgL            Inconclusive	<b>1997 - 2000</b>  <b>164 samples</b> <b>61 sampling events</b> <b>Missing core parameters</b>	OK				Inconclusive	SRP collected 164 samples in 1996-2000. Canal assessed as "inconclusive" due to missing core parameters.
Sycamore Creek headwaters-Agua Fria River AZ15070102-024 A&Wc, FC, FBC, AgL	ADEQ Biocriteria Program Near Dugas, above Ranger MGSYD004.90 100704	1998 - 1 suite	OK					
	<b>Reach Summary Row</b>	<b>1998</b> <b>1 sampling event</b>	OK				Not assessed	Insufficient data to assess. Not enough sampling events.
Tempe Canal 15050100-terminus AZ15050100-115 DWS, Agl, AgL	SRP Routine Monitoring At South Treatment Plant, Guadalupe MGTPC004.16 SVCA 6-9.1	1996 - 11 suites, 3 VOCs 1997 - 10 suites, 9 VOCs 1998 - 11 suites, 10 VOCs 1999 - 8 suites, 2 VOCS 2000 - 10 suites, 9 VOCs, 9 pesticides	OK					Missing core parameters: total metals

**TABLE 16. MIDDLE GILA WATERSHED -- MONITORING DATA -- 2002 ASSESSMENTS**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	STANDARDS EXCEEDED AT THIS SITE PER SAMPLING EVENT					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	<b>Reach Summary Row</b>  DWS      Inconclusive Agl      Inconclusive Agl      Inconclusive	1996 - 2000  50 samples Missing core parameters	OK				Inconclusive	SRP collected 50 samples in 1996 - 2000. Canal assessed as "inconclusive" due to missing core parameters.
Turkey Creek headwaters-Poland Wash AZ15070101-036 A&Ww, FC, FBC, Agl, Agl	ADEQ TMDL Program At tailings runoff (in stream) MG	2001 - 2 metals (3 samples each event) <b>(both are after precipitation)</b>	Arsenic (total) µg/L	50 (FBC) 200 (Agl) 1450 (FC) 2000 (Agl)	444 - 24700*	2 of 2 2 of 20 1 of 2 1 of 2		* (average of samples each date)
			Cadmium (dissolved) µg/L	varies (A&Ww)	240 - 931*	2 of 2		* (worst case of samples each date)
			Cadmium (total) µg/L	41 (FC) 50 (Agl/Agl) 70 (FBC)	97 - 485*	2 of 2 2 of 2 2 of 2		* (average of samples each date)
			Copper (dissolved) µg/L	varies (A&Ww)	3888 - 13,600*	2 of 2		* (worst case of samples each date)
			Copper (total) µg/L	500 (Agl) 5000 (Agl)	1618 - 8488*	2 of 2 1 of 2		* (average of samples each date)
			Lead (total) µg/L	100 (Agl)	34 - 625*	1 of 2		* (average of samples each date)
			Zinc (dissolved) µg/L	varies (A&Ww)	29,000 - 158,000*	2 of 2		* (worst case of samples each date)
			Zinc (total) µg/L	10,000 (Agl) 22,000 (FC) 25,000 (Agl) 42,000 (FBC)	12,667 - 99513*	2 of 2 1 of 2 1 of 2 1 of 2		* (average of samples each date)
	ADEQ TMDL Program At bridge just above tailings MG	2001 - 4 metals <b>(two times during or after precipitation)</b>	OK					
	ADEQ TMDL Program Below bridge MG	2001 - 3 metals <b>(1 during precipitation)</b>	Arsenic (total) µg/L	50 (FBC) 200 (Agl) 1450 (FC) 2000 (Agl)	<5 - 220	1 of 3 1 of 3 0 of 3 0 of 3		* Exceeded during the 1 rain event
			Copper (dissolved) µg/L	varies (A&Ww)	<15 - 41	1 of 3		* Exceeded during the 1 rain event
			Zinc (dissolved) µg/L	varies (A&Ww)	<20 - 430	1 of 3		* Exceeded during the 1 rain event

**TABLE 16. MIDDLE GILA WATERSHED -- MONITORING DATA -- 2002 ASSESSMENTS**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	STANDARDS EXCEEDED AT THIS SITE PER SAMPLING EVENT					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	ADEQ TMDL Program At Forest Road 261	2000 - 1 metals (no hardness) (no precipitation)	OK					
	ADEQ TMDL Program At Forest Road 706	2000 - 1 metals (no hardness) (no precipitation)	OK					
	ADEQ TMDL Program At Goodwin	2000 - 1 metals (no hardness) 2001 - 3 metals (no precipitation)	OK					
	ADEQ TMDL Program At corral	2000 - 1 metal s (no hardness) (no precipitation)	OK					
	ADEQ TMDL Program At Forest Road 93	2000 - 1 metals (no hardness) 2001 - 1 metals (no precipitation)	OK					
	ADEQ TMDL Program Old biocriteria site	2001 1 metals (no precipitation)	OK					
	<b>Reach Summary Row</b>  <b>(Critical condition - precipitation)</b>  <b>A&amp;Ww    Impaired</b> <b>FBC       Inconclusive</b> <b>FC        Inconclusive</b> <b>AgI       Inconclusive</b> <b>AgL       Inconclusive</b>	<b>2000 - 2001</b> <b>9 samples</b> <b>5 sampling events</b>  <b>Missing Core</b> <b>Parameters</b>	Arsenic (total) µg/L	50 (FBC)	<5 - 24700	3 of 5	Inconclusive	ADEQ collected 9 samples in 2000-2001. Using data collected during runoff events, the reach is assessed as "impaired" due to cadmium, copper and zinc during precipitation events. Also, add reach to Planning List due to arsenic and lead exceeding standards.  Newer TMDL monitoring data was used because this newer data shows that the reach is impaired and should remain on the 303(d) List.
				200 (AgL)		3 of 5	Inconclusive	
				1450 (FC)		1 of 5	Inconclusive	
				2000 (AgI)		1 of 5	Inconclusive	
			Cadmium (dissolved) µg/L	varies (A&Ww)	240 - 931	2 of 5 (within 3 years)	Impaired	
			Cadmium (total) µg/L	41 (FC)	97 - 485	2 of 5	Inconclusive	
				50 (AgI/AgL)		2 of 5	Inconclusive	
				70 (FBC)		2 of 5	Inconclusive	
			Copper (dissolved) µg/L	varies (A&Ww)	3888 - 13,600	3 of 5 (within 3 years)	Impaired	
			Copper (total) µg/L	500 (AgL)	1618 - 8488	2 of 5	Inconclusive	
				5000 (AgI)		1 of 5	Inconclusive	
			Lead (total) µg/L	100 (AgL)	34 - 625	1 of 5	Inconclusive	
			Zinc (dissolved) µg/L	varies (A&Ww)	29,000 - 158,000	3of 5 (within 3 years)	Impaired	

**TABLE 16. MIDDLE GILA WATERSHED -- MONITORING DATA -- 2002 ASSESSMENTS**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	STANDARDS EXCEEDED AT THIS SITE PER SAMPLING EVENT					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
			Zinc (total) µg/L	10,000 (Agl)	12,667 - 99513	2 of 2	Inconclusive	
				22,000 (FC)		1 of 2	Inconclusive	
				25,000 (Agl)		1 of 2	Inconclusive	
				42,000 (FBC)		1 of 2	Inconclusive	
	Reach Summary Row (Not during critical conditions - precipitation)  A&Ww Inconclusive FBC Inconclusive FC Inconclusive Agl Inconclusive Agl Inconclusive	12 samples 12 sampling events  Missing core Parameters	OK				Inconclusive	ADEQ collected 12 samples during 2000-2001 at 7 sites. These samples were collected in the absence of a rain event. Reach assessed as "inconclusive" due to lack of core parameters and added to the Planning List.
Unnamed tributary to Turkey Creek AZ15070101- A&Ww, FBC, FC, Agl, AgL	ADEQ TMDL Program At mouth (near mine tailings)	2001 - 1 metals (during precipitation)	OK					
	Reach Summary Row (during precipitation)	1 sampling event 2001	OK				Not assessed	Insufficient monitoring events and core parameters to assess.
Western Canal Tempe Canal-15050100 AZ15060106B-262 Agl, Agl	SRP Routine Monitoring At Lateral 12.8 Near 19th Ave, Phoenix MGWSC012.39 SVCA 7-12.8	1996 - 12 suites, 3 VOCs 1997 - 12 suites, 9 VOCs 1998 - 11 suites, 10 VOCs 1999 - 11 suites, 5 VOCs 2000 - 11 suites, 9 VOCs, 9 pesticides	OK					Missing core parameters: total metals
	Reach Summary Row  Agl Inconclusive Agl Inconclusive	1996 - 2000  57 samples Missing core parameters	OK				Inconclusive	SRP collected 57 samples in 1996 - 2000. Canal assessed as "inconclusive" and added to the Planning List due to missing core parameters (total metals).
Western Canal 15050100-terminus AZ15050100-990 DWS, Agl, Agl	SRP Routine Monitoring At Kyrene Intake MGWSC006.00 SVCA 7-22E	1996 - 3 nutrients, inorganics 1997 - 8 metals 1998 - 11 metals 1999 - 4 metals 2000 - 9 suites, 9 VOCs, 9 pesticides	Boron µg/L	630 (DWS) 1000 (Agl)	41 - 1140	1 of 12		Missing core parameters: no total metals
	Reach Summary Row  DWS Inconclusive Agl Inconclusive Agl Inconclusive	1996 - 2000  35 samples Missing core parameters	Boron µg/L	630 (DWS) 1000 (Agl)	41 - 1140	1 of 12	Inconclusive	SRP collected 35 samples in 1996 - 2000. Canal assessed as "inconclusive" and added to the Planning List due to missing core parameters (total metals).

**TABLE 16. MIDDLE GILA WATERSHED -- MONITORING DATA -- 2002 ASSESSMENTS**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	STANDARDS EXCEEDED AT THIS SITE PER SAMPLING EVENT					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
LAKES MONITORING DATA								
Alvord Park Lake AZL15060106B-0050 A&Ww, FC, PBC	AGFD Urban Lakes Study MGALV-ABC 101053	1998 - 3 suites 1999 - 1 field	Beryllium µg/L	0.21 (FC)	2.5	1 of 1		Three beryllium samples were not counted because the Laboratory Reporting Limit was too high to assess Fish Consumption. Missing core parameter: bacteria.
	AGFD Routine Monitoring up to 6 sites MGALV	1999 - 1 field, ammonia, nutrient samples 2000 - 2 field, ammonia, nutrient samples	OK					Missing core parameters: turbidity and bacteria.
	ADEQ Urban Lakes Study MGALV-A 101040	1998 - 10 field 1999 - 2 field	pH (high) SU	6.5 - 9.0 (A&Ww, PBC)	7.78 - 9.24	1 of 12		Alvord Lake exhibited high dissolved oxygen and high pH readings caused by an algal bloom during the sampling event in June 29, 1998.
	ADEQ Urban Lakes Study MGALV-B 101041	1998 - 10 field 1999 - 2 field	pH (high) SU	6.5 - 9.0 (A&Ww, PBC)	8.39 - 9.26	1 of 12		
	ADEQ Urban Lakes Study MGALV-C 101042	1998 - 10 field 1999 - 2 field	pH (high) SU	6.5-9.0 (A&Ww, PBC)	7.9 - 9.23	1 of 12		
	Reach Summary Row  A&Ww      Inconclusive FC          Attaining PBC        Inconclusive	43 samples 19 sampling events Missing bacteria samples	Beryllium µg/L	0.21 (FC)	2.5	1 of 1	Inconclusive	ADEQ and AGFD collected a total of 19 sample events at ten sites in 1998-2000. Sample results collected during the same sampling event were combined in this summary row. Lake assessed as “attaining some uses.” Add to Planning List due to beryllium exceeding some uses and missing core parameters.
			pH (high) SU	6.5 - 9.0 (A&Ww, PBC)	7.78 - 9.26	1 of 19	Attaining	
Chaparral Lake AZL15060106B-0300 A&Ww, FC, PBC, Agl	AGFD Routine Monitoring MGCHA	1997 - 1 field	OK					Missing core parameters: bacteria. (No mining activities in the watershed so metals are not required.)
	ADEQ & AGFD Urban Lakes MGCHA-A 101045	1998 - 10 field 1999 - 2 field	Dissolved oxygen mg/L	6.0 (90% saturation) (A&Ww)	4.6 - 13.98	2 of 12		
			pH (high) SU	6.5 - 9.0 (A&Ww, PBC, Agl)	7.86 - 9.36	3 of 12		
	ADEQ & AGFD Urban Lakes MGCHA-B 101046	1998 - 10 field 1999 - 2 field	Dissolved oxygen mg/L	6.0 (90% saturation) (A&Ww)	5.18 - 13.82	2 of 12		
			pH (high) SU	6.5 - 9.0 (A&Ww, PBC, Agl)	8.01 - 9.38	2 of 12		
	ADEQ & AGFD Urban Lakes MGCHA-AB 101056	1998 - 3 metals, ammonia, inorganics 1999 - 1 field	OK					
	Reach Summary Row  A&Ww      Inconclusive FC          Attaining PBC        Inconclusive Agl                      Inconclusive	29 samples 16 sampling events Missing bacteria samples	Dissolved oxygen mg/L	6.0 (90% saturation) (A&Ww)	4.6 - 13.98	2 of 12	Attaining	ADEQ and AGFD collected a total of 16 sample events at four sites in 1997-1999. Lake assessed as “attaining some uses”and was added to the Planning List due to pH not meeting standards and missing core parameters.
			pH (high) SU	6.5 - 9.0 (A&Ww, PBC, Agl)	7.86 - 9.38	3 of 12	Inconclusive	



**TABLE 16. MIDDLE GILA WATERSHED -- MONITORING DATA -- 2002 ASSESSMENTS**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	STANDARDS EXCEEDED AT THIS SITE PER SAMPLING EVENT					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
Cortez Park Lake AZL15060106B-0410 A&Ww, FC, PBC, Agl	ADEQ & AGFD Urban Lakes MGCOR-A 101043	1998 - 10 field 1999 - 2 field	Dissolved oxygen mg/L	6.0 (90% saturation) (A&Ww)	4.02 - 12.78	1 of 12		Data collected at these sites during the same sampling events were combined for the assessment as they are not spatially independent.  Missing core parameters: bacteria.
			pH (high) SU	6.5 - 9.0 (A&Ww, PBC, Agl)	8.09 - 9.96	5 of 12		
	ADEQ & AGFD Urban Lakes MGCOR-B 101044	1998 - 10 field 1999 - 2 field	Dissolved oxygen mg/L	6.0 (90% saturation) (A&Ww)	3.9 - 11.26	1 of 12		
			pH (high) SU	6.5 - 9.0 (A&Ww, PBC, Agl)	8.01 - 9.55	4 of 12		
	ADEQ & AGFD Urban Lakes MGCOR-AB 101055	1998 - 3 suites 1999 - 1 field	OK					
	<b>Reach Summary Row</b>  A&Ww Inconclusive FC Attaining PBC Inconclusive Agl Inconclusive	<b>1998 - 1999</b>  28 samples 12 sampling events Missing bacteria samples	Dissolved oxygen mg/L	<b>6.0 (90% saturation) (A&amp;Ww)</b>	<b>3.9 - 12.78</b>	<b>1 of 12</b>	<b>Attaining</b>	<b>ADEQ &amp; AGFD collected a total of 12 event samples at three sites in 1998-1999. Cortez Park Lake is assessed as "attaining some uses." Add to Planning List due to pH exceeding standards and missing bacteria samples.</b>
			pH (high) SU	<b>6.5 - 9.0 (A&amp;Ww, PBC, Agl)</b>	<b>8.01 - 9.96</b>	<b>5 of 12</b>	<b>Inconclusive</b>	
Eldorado Park Lake AZL15060106B-0490 A&Ww, FC, PBC	AGFD Routine Monitoring MGELP	1997 - 1 field, ammonia, nutrient	Dissolved oxygen mg/L	6.0 (90% saturation) (A&Ww)	4.8	1 of 1		
	<b>Reach Summary Row</b>	<b>1997</b> <b>1 sampling event</b>	<b>Dissolved oxygen mg/L</b>	<b>6.0 (90% saturation) (A&amp;Ww)</b>	<b>4.8</b>	<b>1 of 1</b>	<b>Not assessed</b>	<b>Insufficient data to assess all designated uses. Add to Planning List due to low dissolved oxygen.</b>
Encanto Park Lake AZL15060106B-0510 A&Ww, FC, PBC, Agl	AGFD Routine Monitoring MGENC	1997 - 1 suite	OK					
	<b>Reach Summary Row</b>	<b>1997</b> <b>1 sampling event</b>	<b>OK</b>				<b>Not assessed</b>	<b>Insufficient data to assess.</b>
Fain Lake (in Lynx Creek) AZL15070101-0005 A&Ww, FC, FBC, AgL	AGFD Routine Monitoring 3 sites combined MGFAI	1997 - 1 suite 1998 - 3 suites	OK					Missing core parameters: turbidity, bacteria, some metals. The Laboratory Reporting Limit for mercury was not low enough to assess Fish Consumption.
	<b>Reach Summary Row</b>  A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive	<b>1997 - 1998</b>  4 event samples	<b>OK</b>				<b>Inconclusive</b>	<b>AGFD collected 4 samples in 1997- 1998. The lake is assessed as "inconclusive." Add to Planning List due to missing core parameters and the high Laboratory Reporting Limit for mercury.</b>
Lake Pleasant AZL15070102-1100 A&Ww, FC, FBC, Agl, AgL	AGFD Routine Monitoring 4 sites combined MGPLE	1996 - 1 suites 1997 - 2 suites 1998 - 1 suites, 1 field 2000 - 2 suites	Dissolved oxygen mg/L	6.0 (90% saturation) (A&Ww)	4.61 - 9.3	2 of 20		Missing core parameters: dissolved metals, turbidity, bacteria, boron, beryllium, and lead. The Laboratory Reporting Limit for mercury is too high to assess Fish Consumption.
	ADEQ Lakes Program MGPLE-A 100067	2000 - 2 suites, VOCs	OK					Missing core parameters: bacteria. (same event as other ADEQ sites)
	ADEQ Lakes Program MGPLE-B 100068	2000 - 2 suites, VOCs	OK					Missing core parameters: bacteria. (same event as other ADEQ sites)

**TABLE 16. MIDDLE GILA WATERSHED -- MONITORING DATA -- 2002 ASSESSMENTS**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	STANDARDS EXCEEDED AT THIS SITE PER SAMPLING EVENT					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	ADEQ Lakes Program MGPLE-MAR 101000	2000 - 3 VOCs, pH	OK					Only core parameter was pH.
	<b>Reach Summary Row</b>  A&Ww      Inconclusive FC          Inconclusive FBC        Inconclusive Agl        Inconclusive AgL        Inconclusive	1996 - 2000  13 samples 9 sampling events Missing core parameters	Dissolved oxygen mg/L	6.0 (90% saturation) (A&Ww)	4.61 - 9.3	2 of 23	Attaining	ADEQ & AGFD collected a total of 30 samples at 6 sites. Lake assessed as "inconclusive" core parameters and sampling events.
Lynx Lake AZL15070102-0860 A&Wc, FC, FBC, DWS, AgI, AgL	AGFD Routine Monitoring 5 sites combined MGLYN	1997 - 2 suites 1998 - 3 suites, 4 field 2000 - 2 suites	OK					Missing core parameters: turbidity, dissolved metals, bacteria, arsenic, beryllium, fluoride, barium, and boron. Laboratory Reporting Limit for mercury is too high to assess Fish Consumption.
	<b>Reach Summary Row</b>  A&Wc      Inconclusive FC          Inconclusive FBC        Inconclusive DWS        Inconclusive Agl        Inconclusive AgL        Attaining	1997 - 2000  11 sampling events Missing core parameters	OK				Attaining	AGFD collected 11 samples in 1997-2000. Lake is assessed as "attaining some uses." Add to Planning List due to missing core parameters and the high Laboratory Reporting Limit for mercury.
Papago Park Ponds AZL15060106B-1030 A&Ww, FC, PBC	ADEQ & AGFD Urban Lakes MGPA-P-A 101047	1998 - 10 pH and DO 1999 - 2 pH and DO	OK					This site is combined with MGPA-P-B & MGPA-P-AB because they are not spatially independent.
	ADEQ & AGFD Urban Lakes MGPA-P-B 101048	1998 - 10 pH and DO 1999 - 2 pH and DO	OK					This site is combined with MGPA-P-A & MGPA-P-AB because they are not spatially independent.
	ADEQ & AGFD Urban Lakes MGPA-P-AB 101057	1998 - 3 suites 1999 - 1 ammonia, nutrients	OK					Missing core parameters: bacteria
	<b>Reach Summary Row</b>  A&Ww      Attaining FC          Attaining  PBC        Inconclusive	1997 - 2000  16 sampling events Missing bacteria samples	OK				Attaining	ADEQ & AGFD collected 12 samples at 1 site. Lake assessed as "attaining some uses." Add to Planning List due to missing bacteria samples.

**TABLE 16. MIDDLE GILA WATERSHED -- MONITORING DATA -- 2002 ASSESSMENTS**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	STANDARDS EXCEEDED AT THIS SITE PER SAMPLING EVENT					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
Tempe Town Lake AZL15060106B-1588 (Standards have not yet been adopted for the lake; therefore, the lake is assessed under the Salt River designated uses) A&We, PBC	City of Tempe Sampling Aquatic Consulting Upstream Dam site MGTTL-USD	<b>Before treatment</b> 1999 - 1 suite, 14 field & bact 2000 - 21 suites + 31 field 2001 - 21 suites + 31 field 2002 - 16 field	pH (high) SU	6.5 - 9.0 (A&We, PBC)	7.5 - 9.7	26 of 126		
		<b>After treatment</b> 2002 - 13 field	OK					
	City of Tempe Sampling Aquatic Consulting South Shore Line site MGTTL-SSL	<b>Before treatment</b> 1999 - 1 suite, 16 field & bact 2000 - 21 suites + 31 field 2001 - 21 suites + 31 field 2002 - 16 field	pH (high) SU	6.5 - 9.0 (A&We, PBC)	7.7 - 9.7	32 of 125		
		<b>After treatment</b> 2002 - 6 field	OK					
	City of Tempe Sampling Aquatic Consulting Mid Lake site MGTTL-ML	<b>Before treatment</b> 1999 - 1 suite, 15 field & bact 2000 - 21 suites + 31 field 2001 - 21 suites + 31 field 2002 - 16 field	pH	6.5 - 9.0 (A&We, PBC)	7.9 - 9.7	35 of 125		
		<b>After treatment</b> 2002 - 13 field	OK					
	City of Tempe Sampling Aquatic Consulting Mid-depth Downstream site MGTTL-MDD	<b>Before treatment</b> 1999 - 3 suites, 13 field 2000 - 21 suites + 31 field 2001 - 21 suites + 31 field 2002 - 16 field	pH	6.5 - 9.0 (A&We, PBC)	7.8 - 9.7	31 of 124		
		<b>After treatment</b> 2002 - 6 field						
	City of Tempe Sampling Aquatic Consulting Downstream Dam site MGTTL-DSD	<b>Before treatment</b> 1999 - 1 suite, 16 field & bact 2000 - 21 suites + 31 field 2001 - 21 suites + 31 field 2002 - 16 field	pH	6.5 - 9.0 (A&We, PBC)	7.7 - 9.7	35 of 124		
		<b>After treatment</b> 2002 - 13 field						

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	Reach Summary Row  A&We      Not attaining PBC        Not attaining	1999 - 2002  670 samples 249 sampling events	pH (high) SU	6.5 - 9.0 (A&We, PBC)	7.5 - 9.7	169 of 623	Not attaining	City of Tempe collected a total of 670 samples at 5 sites after filling this new lake in 1999 to present. The city is currently applying an algacide and dye to control algal blooms. This treatment also appears to be effective in keeping the pH values within standards. The lake was assessed as "not attaining" and placed on the Planning List because of: 1. Tempe's commitment to maintain this treatment and lake water quality, 2. The treatment has been successful to date (after 2 months), 3. Tempe continues to monitor weekly and is providing documentation of its technical-based treatment program, and 4. More monitoring is needed to determine the effectiveness of the new treatment.

**Information for interpreting these Monitoring Tables**

- "Segment" designates the beginning and end points of the reach.
- "Waterbody ID" is derived from combining the following: AZ (for streams) or AZL (for lakes) + a US Geological Survey Hydrologic Unit Code + EPA stream reach number or ADEQ lake number.
- "Designated Uses," "Agency," and "Units" (of measurement) abbreviations are defined in Appendix A.
- "Site Code" is an ADEQ derived abbreviation for the surface water basin, stream name or lake name, and the location of the site. For streams, the numbers are the miles upstream from mouth (normally measured as a straight line vector).
- "ADEQ Database ID" -- This is ADEQ's water quality database reference number. If the data is not in this database, no number will be shown.
- "Samples" -- The year and number of water samples is shown. The federal "water year" is used, from October 1<sup>st</sup> through September 30<sup>th</sup>, rather than the calendar year. Types of samples:
  - < "Suite" indicates that a broad range of chemical constituents were collected and field measurements were taken (normally inorganics, metals, nutrients, and bacteria.) The chemical constituents monitored are not consistent among the many monitoring entities that provided the data. If the suite did not include the core parameters needed to assess a designated use as "attaining," the missing core parameters are indicated.
  - < "Field" indicates that only field measurements such as dissolved oxygen, pH, turbidity, and water temperature were collected.
  - < If a specific parameter or parametric group (e.g., zinc, metals, bacteria) is named, monitoring was limited to only these parameters
- "Standards Exceeded at this Site per Sampling Event."
  - < Although many parameters may be analyzed, only those exceeding a standard are shown. Other parameters were collected.
  - < "OK" indicates that no standards were exceeded.
  - < The specific standards are shown as a single parameter may have multiple standards depending on the designated uses assigned. (See standards in Appendix C.)
  - < "The Range of Results" indicates the minimum and maximum sample results. If the laboratory reported result is "less than the detection limit" or "not detected," a less than (<) value will be shown along with the detection limit (e.g., <0.5 mg/L).
  - < A mean, geometric mean, or median will be shown along with the range of results if applicable to the standard or assessment criteria.
- "Comments" include other information used in interpreting the data for assessments, such as evidence that exceedance is solely due to natural conditions, or that the data does not meet the new "credible" data requirements.
- In the "Summary Row" parameter exceedances are combined from multiple sites, and the assessment of each designated use is shown. The overall assessment for the surface water is described in the "Comments" field: "Attaining," "Not attaining," "Impaired," or "Inconclusive." See assessment criteria in Chapter III of Volume I.

## Ground Water Assessments in the Middle Gila

**Major Ground Water Stressors** -- Monitoring data collected from wells in this watershed between October 1995-October 2000 are summarized in **Table 17** and illustrated in **Figure 30, 31, and 32**. As **Table 17** indicates, wells are sampled for different constituents.

More than 350 wells were monitored. Of these, 321 wells were monitored in conjunction with Superfund cleanup sites with volatile and semi-volatile organic chemical contamination. **Figure 30** illustrates wells involved in these contamination areas; however, some sites are small, and therefore, difficult to illustrate on this scale map. The types of pollutants and remediation strategies for these sites is included in the following section .

Fluoride contamination seems to be occurring only in the western half of the watershed, while nitrate contamination is widespread across the watershed, and metal contamination is isolated in pockets. It is interesting to note that although significant irrigated crop production has occurred in this watershed, no pesticides were even detected in the 227 wells monitored.

**TDS Concentrations** – Water quality can be characterized based on concentration of Total Dissolved Solids (TDS). High levels of salinity limits the practical uses of ground water in some areas of this watershed as TDS over 500 mg/L has an off-flavor, and TDS over 1000 mg/L will limit its use for some crops. Of the 94 wells monitored, 70% were over 500 mg/L and 11% were over the 1000 mg/L. As illustrated in **Figure 31**, elevated TDS occur in wells primarily located next to the Salt and Gila River, with exceptionally high levels of salinity west of Phoenix. (The Salt River was named for its natural salinity.)

No TDS water quality standards apply in this watershed, and the elevated levels of TDS do not present a human-health concern for drinking waters. The TDS concentration is only used to generally characterize water quality.

**Nitrate Concentrations** – Water quality can also be characterized by looking at the concentration of nitrates in ground water. Naturally occurring nitrate concentrations in ground water are generally below 3 mg/L. Concentrations above 5 mg/L indicate potential anthropogenic sources of nitrate. Of the 192 wells monitored for nitrate, 57% exceeded this 5 mg/L concentration. As illustrated in **Figure 32**, these wells are scattered across the watershed. These areas may be related to historic irrigated agriculture or septic systems.

When nitrate concentrations exceed 10 mg/L, Arizona's Aquifer Water Quality Standard has been exceeded. This standard was set to protect human health ,as water with nitrate greater than 10 mg/L may present a health problem for babies and should not be consumed by nursing mothers. Forty-eight of the 192 wells monitored (25%) exceeded 10 mg/L. As many of these wells are irrigation wells (not used for drinking water), nitrates over 10mg/L may not represent a human-health concern. However, efforts should be made to minimize further contamination of ground water by nitrate.

**Table 17. Middle Gila Watershed Ground Water Monitoring 1996 - 2000**

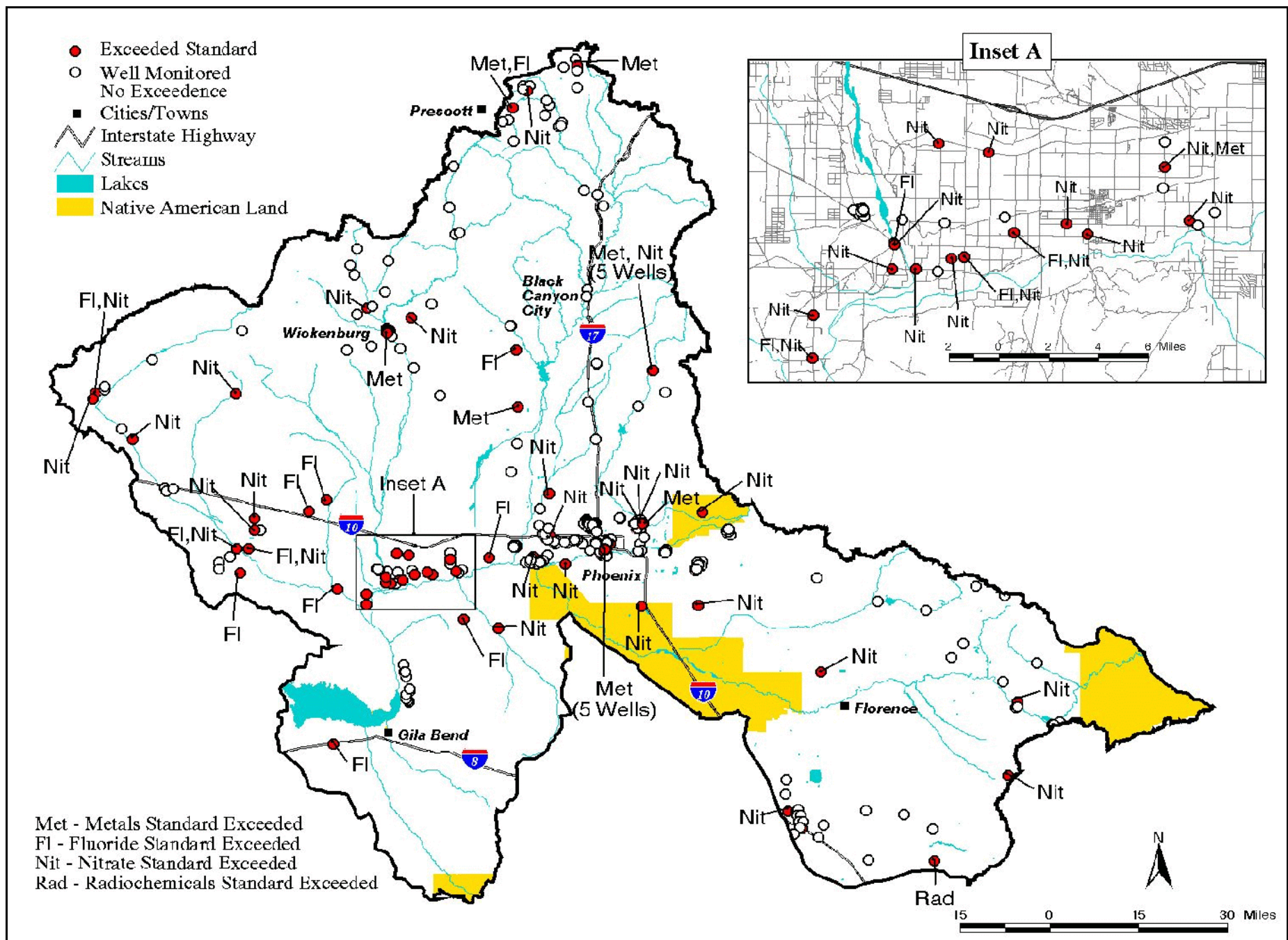
MONITORING DATA TYPE	PARAMETER OR PARAMETER GROUP	NUMBER OF WELLS			PERCENT OF WELLS EXCEEDING STANDARDS
		SAMPLED	SYNTHETIC CONSTITUENT DETECTED*	EXCEEDING STANDARDS	
INDEX WELLS	Radiochemicals	2		0	0%
	Fluoride	33		2	6%
	Metals/Metalloids	33		2	6%
	Nitrate	33		5	15%
	VOCs + SVOCs*	2	0	0	0%
	Pesticides	2	0	0	0
TARGETED MONITORING WELLS	Radiochemicals	14		1	7%
	Fluoride	104		16	15%
	Metals/metalloids	260		15	6%
	Nitrate	159		43	27%
	VOCs + SVOCs*	319	200	139	44%
	Pesticides	226	0	0	0%

WELL CLASSIFICATION BY TOTAL DISSOLVED SOLIDS (TDS) CONCENTRATION				
Total Number of Wells	Wells <500 mg/L Acceptable drinking water flavor	Wells 500-999 mg/L Fresh (not saline) Some crop production problems	Wells 1000-3000 mg/L Slightly saline Increasing crop production problems	Wells >3000 mg/L Moderately saline to briny Severe crop production problems
94	28	27	19	10

WELL CLASSIFICATION BY NITRATE CONCENTRATION (measured as Nitrogen)			
Total Number of Wells	Wells <5 mg/L	Wells 5-10 mg/L May be an anthropogenic source of Nitrates	>10 mg/L Exceeds standards Should not be used for drinking water by babies or nursing mothers
192	109	35	48

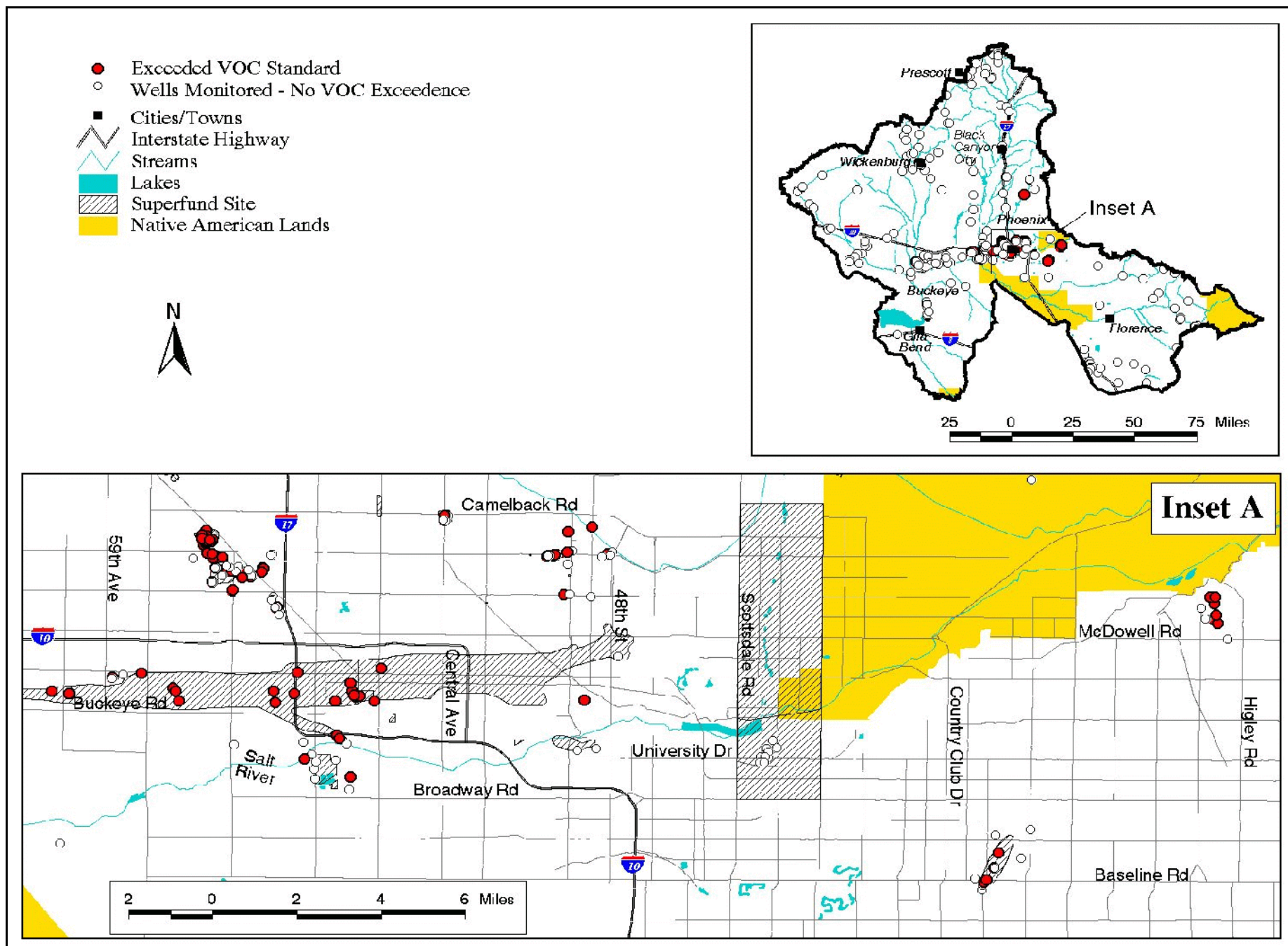
\*VOCs = volatile organic compounds; SVOCs = semi-volatile organic compounds.

\*The detection of a synthetic constituent (pesticides, VOCs, and SVOCs) is noted because some do not have standards and these substances are not naturally occurring in the ground water.



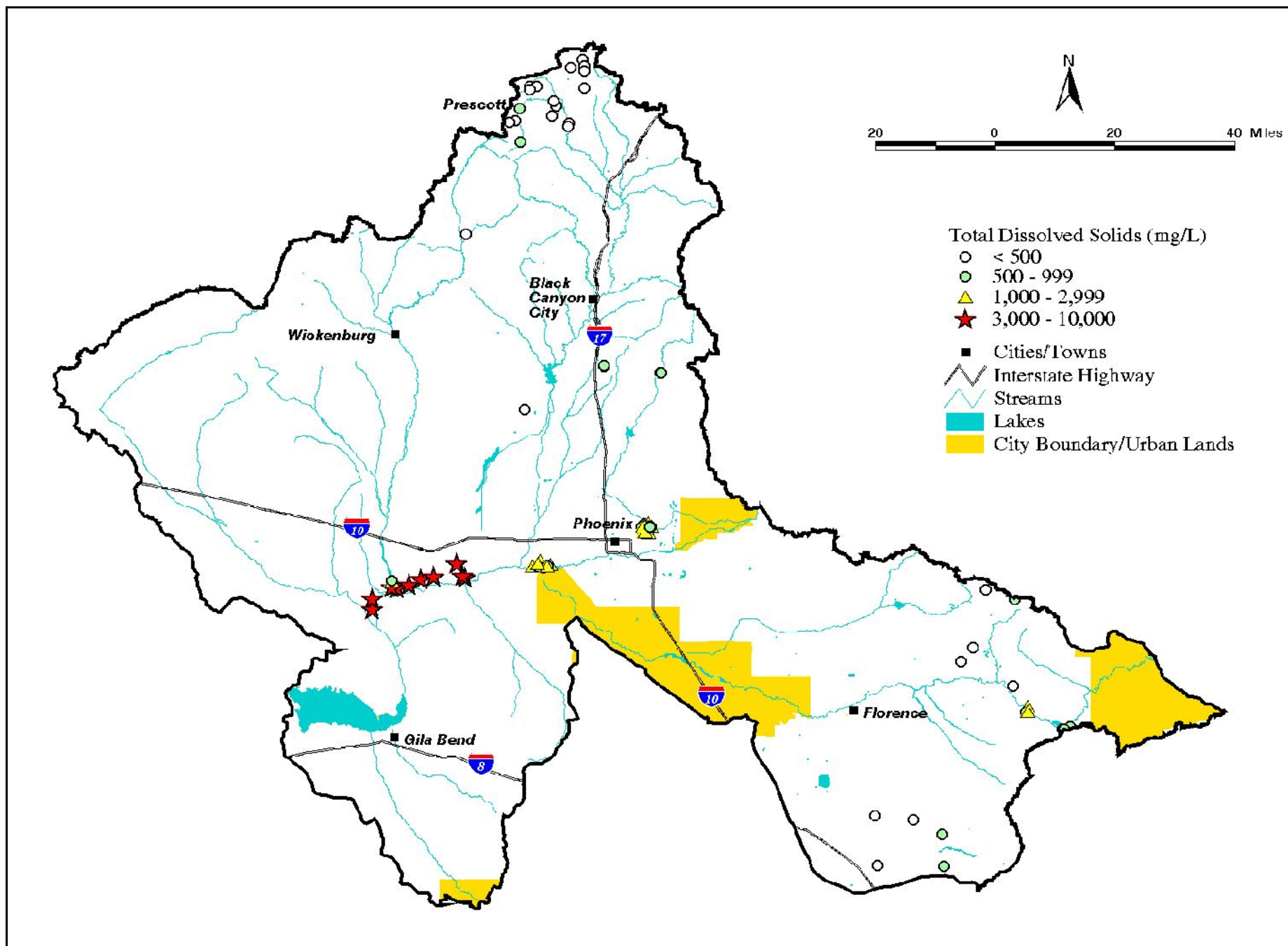
**Figure 30a. Ground Water Monitoring in the Middle Gila Watershed – 1995-2000**



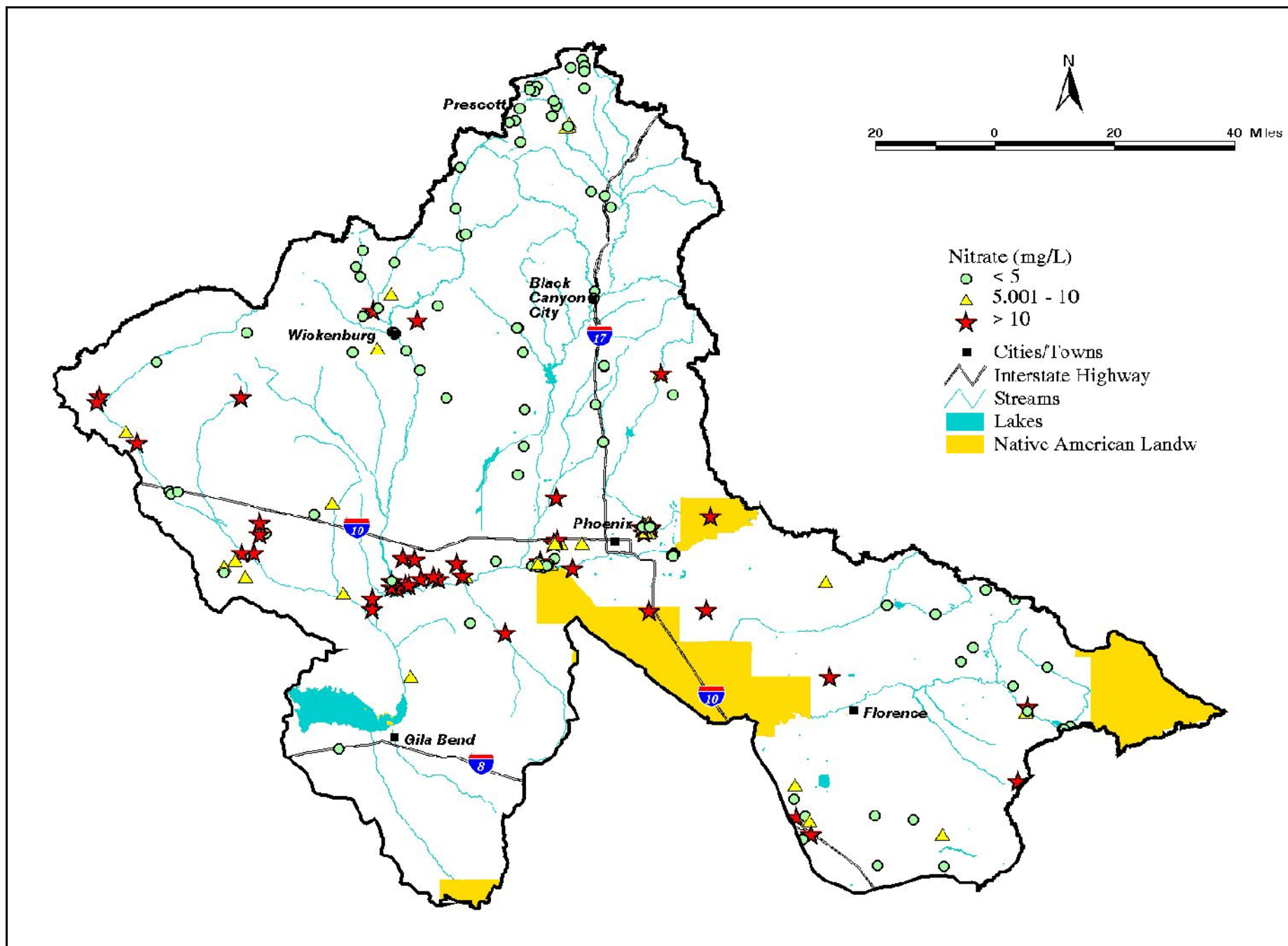


**Figure 30b. Volatile and Semi-volatile Organic Compound Well Contamination in the Middle Gila Watershed**





**Figure 31. Classification of Ground Water Quality by TDS Concentration in the Middle Gila Watershed**



**Figure 32. Classification of Ground Water Quality by Nitrate Concentration in the Middle Gila Watershed**

## Watershed Studies and Alternative Solutions in the Middle Gila Watershed

This section highlights surface and ground water studies, mitigation projects, and remediation activities which have been conducted to improve water quality in the Middle Gila Watershed. Watershed partnerships active in this watershed are also mentioned.

### Surface Water Studies and Mitigation Projects

**Total Maximum Daily Load Studies** – Several TMDL studies have been initiated in this watershed. Most are in the initial monitoring and modeling stage. Further information about the status of any of these TMDLs can be obtained by contacting the TMDL Program at (602) 771-4468 or through ADEQ's web site at: <http://www.adeq.state.az.us/enviro/water/assess/tmdl.html>

- **Hassayampa River Study** – The segment of the Hassayampa River from its headwaters to Blind Indian Creek, near the town of Wagoner, is included in this study area. The TMDL will determine the sources of cadmium, copper, and zinc. Several abandoned mines and tailings piles are located in this Hassayampa drainage area. One tailings pile is actually on the water's edge at the old Senator Mine.
- **Turkey Creek Study** – A segment from its headwaters to Poland Creek is on the 303(d) List due to arsenic, cadmium, copper, cyanide, lead, and zinc. An active mine (The Golden Turkey Mine) and numerous abandoned mines are in this drainage area. The US Forest Service and EPA are cooperating with ADEQ in collecting samples, with seven different sample locations to determine the extent and possible sources of these pollutants.
- **French Gulch Study** – French Gulch is a small tributary to the Hassayampa River which is on the 303(d) List due to: cadmium, copper, manganese, pH and zinc. The study area includes the inactive Zonia Mine and numerous abandoned mines. ADEQ is coordinating with Arimetco Inc., the current owner of the Zonia Mine, who is already submitting quarterly sample results for French Gulch under a compliance order. Three different sample locations below the Zonia Mine are being used to determine the extent and possible sources of pollutants.

**Middle Gila River Pesticides Studies** – Previous studies of fish and wildlife

tissue contamination have lead to the issuance of fish consumption advisories due to four banned pesticides: DDT, toxaphene, dieldrin, and chlordane (Kepner, 1987; ADHS, 1991). Two studies have been completed to determine the status of wildlife contamination.

- U.S. Fish and Wildlife Service collected fish tissue and sediment samples in 1994 and 1995 (King, et al., 1997) along the Gila River to compare levels of pesticide and metals with the previous USFWS study in 1985 (Kepner, 1987). The new report concluded that residues of DDT have declined over the last decade but remain extremely high when compared to national averages. DDE residues were greatest in fish from agricultural drains, particularly Buckeye Canal and Dysart Drain. The number of pesticides detected in biota have also declined dramatically, with six detected in 1994-1995 versus 16 compounds in 1985.

Eleven potentially toxic metals were detected in fish tissue. Most metals concentrations remained unchanged from the previous study. Copper concentrations in 65% of fish exceeded the national average.

Generally, softshell turtles were more contaminated with pesticides and metals than fish. Concentrations of mercury and selenium were relatively low and do not pose a threat to fish. The greatest potential impact of contaminants is to top-level predators such as black-crowned night-herons, potentially impacting their reproductive systems.

Although this study focused on contaminant threats to fish and wildlife, hazards to human health were also obvious. Potentially health threatening levels of DDE were present in fish fillets from Buckeye Canal and Painted Rock, exceeding the screening levels proposed by EPA and ADEQ for the protection of human health. None of the fish fillet samples exceeded the EPA guidance level for mercury. However, higher levels of mercury were found in Painted Rock Bass fillets than from Bass samples collected in the late-1980s.

- During 1999, fish tissue samples were collected by the ADEQ's

Priority Pollutant Program at three sites on the Middle Gila River between Phoenix and Gillespie Dam to measure pesticide contamination levels. These samples revealed considerably lower DDT concentrations than were found in previous studies of the area; however, DDT levels were above EPA's screening concentration levels. Also, some individual samples contained high concentrations of toxaphene. Dieldrin was not found above detection levels. The recommendations generated by this study are to keep the fish advisories on the Middle Gila for DDT and toxaphene. It was also recommended that the dieldrin consumption advisory be rescinded.

#### **The US Fish and Wildlife Service Contaminant Study of Mineral Creek –**

Fish and sediments were collected in 1993 and 1995 in the lower reaches of Mineral Creek, a tributary to the Gila River in Pinal County (Andrews and King, 1997). Habitat quality and fish population diversity and abundance were also assessed to determine possible negative impacts on wildlife due to discharges from Ray Mine. Despite elevated concentrations of copper, lead, and zinc in sediment and some fish samples, the overall ecology of Mineral Creek improved from 1993 to 1995. Cleanup efforts by the mine improved ecological conditions of Mineral creek, and by 1995, four species of fish were present in the area that was nearly devoid of fish only two years earlier.

**Federal Permits and Compliance Monitoring** – EPA and ADEQ have required several federal permit holders in this watershed (NPDES and 404 permits) to do instream water quality monitoring to determine the effectiveness of permit restrictions and remediation actions.

- The ASARCO Ray Mine complex, located along Mineral Creek, is the second largest copper mining operation in Arizona covering approximately 20-25 square miles. The 122 square mile Mineral Creek drainage area flows through this mine site. A dam about 1.5 miles above the open pits area slows surface water flow and runoff, then a tunnel diverts the flow around the open pits, returning the flow to its channel above some of the leaching facilities.

A joint ADEQ/EPA Consent Decree in 1998 required that ASARCO build a new tunnel to divert flow from above the "Pearl Handle Pit," a large open pit mine area, into the old diversion tunnel. The new tunnel, which is nearly complete in 2001, will also divert water flow away from some of the leaching facilities located upstream of the large open pit mine area. Mineral Creek was also concrete-lined below the

old tunnel in 2001 to prevent any potential leaching contaminants from large heap leach piles to percolate into the stream channel. This consent decree occurred because of 47 point source discharges reported from August 1988 through November 1997 that have threatened water quality in Mineral Creek and violated EPA's NPDES permit conditions and the Arizona's Aquifer Protection Permit regulations. Several of the discharges have resulted in surface water quality violations for copper, pH, beryllium and cadmium. Ground water generally has cadmium and fluoride exceedances at the proposed Point of Compliance but no determination has yet been made as to whether these are natural or due to mine discharges.

Five sample sites have been established by ASARCO to ascertain the water quality impacts to Mineral Creek potentially caused by their operation. Data from these five sample sites were used to assess Mineral Creek.

- < At Indian Gardens, above the active mining operations. This site was established to determine natural background and contributions from upstream abandoned mines.
- < Above Pearl Handle Pit and the old diversion tunnel, downstream of the "4D" waste rock deposition area and several small heap leach piles and adits. The new diversion tunnel will divert flow around this site into the old tunnel. Also, an interceptor well and pump were installed in 1998 just above this sample point.
- < At the bottom end of the old diversion tunnel.
- < Downstream of the old diversion tunnel outlet. This portion of Mineral Creek was channelized with concrete (finished in 2001).
- < Below the Highway 177 bridge, and just above the Gila River. This lower portion of Mineral Creek once again becomes a natural drainage channel.

- BHP Copper Inc. mining along Queen Creek – A storm water NPDES permit requires the mine to measure metals concentrations at two points on Queen Creek, submit a Best Management Practices plan and implement it. In June of 2000, ADEQ also recommended updating bioassessment monitoring requirements to the NPDES Permit, and these changes were incorporated into the permit. Starting in August 2000, BHP Copper Inc., agreed to take action to remove acid-generating waste rock from contact with storm water run-off.

- City of Tempe for Tempe Town Lake in the Salt River – The Tempe Town Lake, approximately 220 acres in size, is the newest of the urban lakes in the Middle Gila watershed. This artificial lake with two inflatable rubber dams was first filled with water in June 1999. As a condition of their 404 and 401 permits Tempe is required to sample the lake's water quality monthly. Five sample points have been established. Based on more than a year of sampling the only two constituents found to be in exceedance of state surface water standards were high pH and low dissolved oxygen. Both of these conditions are typical for urban impoundments in the Phoenix-metro area and have also been observed due to seasonal algae blooms and lake turnover.

**Salt River Project (SRP) Routine Monitoring** – Two rivers (the Salt and Verde), the Central Arizona Project (CAP) canal, and ground water are the source waters to SRP's canal system which supplies drinking water and irrigation water to much of the Phoenix metropolitan area. SRP conducts routine monitoring of all of these sources and shares its water quality information with its users, shareholders, and other interested parties. Besides naturally occurring minerals, the canals were sampled for a variety of pollutants including metals, pesticides and VOCs. The samples are taken monthly as a grab sample, providing a snapshot of water quality in each canal sampled. Water quality can and does vary due to the volume and mixture of water from these sources varying seasonally, the amount and quality of agricultural return flows, Urban storm water runoff, evaporation, and seepage.

**Water Protection Fund Projects** – The following projects received Water Protection Funds from the Arizona Department of Water Resources.

- Picacho Reservoir Riparian Enhancement Project – Completed in 2000, this project enabled Pinal County to purchase sufficient quantities of Central Arizona Project (CAP) water over a 15-20 year period and enhance the 2,400-acre riparian and wetland habitat that currently exists within Picacho Reservoir. The habitat was periodically threatened by lack of water caused by irrigation draw-down and drought. Under this grant, Pinal County was able to establish a minimum pool within the reservoir to provide protection and enhancement of wildlife and aquatic resources.
- Assessment of the Role of Effluent Dominated Rivers in Supporting Riparian Functions – Arizona State University researchers studied sites

along six reaches of three Arizona streams (two reaches per stream), where both an effluent dominated Section and a natural perennial section existed. The study concentrated on one of the selected streams and compared some of the functions of the riparian ecosystem along the effluent-dominated and non-effluent dominated reaches. The objective was to determine whether there were differences in ecosystem responses between effluent-dominated reaches and non-effluent dominated reaches. This project was completed in 1997.

- Tres Rios River Management and Constructed Wetlands Project – The Tres Rios project encompasses 5,600 acres along a portion of the Salt and Gila rivers, extending from 83<sup>rd</sup> Avenue to a downstream point at the Agua Fria River. Based on a feasibility study by the Army Corps of Engineers, this project is to establish a constructed wetland that will provide critical riparian and wetland habitats that have been lost due to water diversions and resource development in the Phoenix metropolitan area.
- Tres Rios Wetland Heavy Metal Bioavailability Design for Denitrification and Microbial Water Quality – The City of Phoenix received Watershed Protection Funds to investigate three issues identified during operation of the Tres Rios Wetland Demonstration Project:
  - < Are heavy metals in the wetlands bioavailable and are there operational strategies that would mitigate or exacerbate this phenomena?
  - < What is the contribution of autotrophic bacteria to the overall denitrification efficiency of the wetland and can this information be used to better estimate wetland surface area requirements? and
  - < Are bacteria/pathogen concentrations due to wildlife inputs or re-growth, and what is the survivability of pathogens in a constructed wetland?

Sampling and analysis of water, sediment, vegetation and fish tissue will be conducted to achieve the project objectives, and the findings of this study will be presented in an interpretative final report in 2001 or early 2002.

- Queen Creek Restoration and Management Plan – The town of

Superior received funds to develop a Queen Creek restoration and management plan for the Queen Creek corridor. That corridor extends from its headwaters in the Tonto National Forest, through the town of Superior to the Boyce Thompson Southwestern Arboretum. The plan will address restoration of stream flow and riparian vegetation, and technical studies will be conducted to determine riparian vegetation water needs and channel flood conveyance capacity. The project was completed in 1999.

- Wickenburg High School Stream Habitat Creation – Wickenburg Unified School District was funded to add a recirculating stream to a wastewater treatment wetland. This would provide additional aeration to the open water portion of the treatment wetland. The applicant also proposes to create a riparian and xero-riparian vegetative community at the 15-acre project site. Over 800 mesquite, willow and cottonwood trees will be planted as well as a native shrub/scrub mixture. Basic monitoring will be conducted by students as part of the educational component of this project. The project is to be completed in 2003.
- Rio Salado Habitat Restoration Project -- The city of Phoenix Parks and Recreation Department received funds to create a vegetation demonstration project that would:
  - < Test the performance of various plant materials planned for use in the greater Rio Salado project under various supplemental irrigation strategies and
  - < Evaluate the treatment quality of the created wetlands for treating storm water, one of the water sources of the project.

The greater Rio Salado project will create authentic Sonoran Desert riparian habitat, adapted for the highly altered Salt River channel as it passes through Phoenix. Phoenix will create a low-flow channel to alleviate plant kill associated with long-term inundation and to provide opportunity for aquatic strand/shrub habitat types. An estimated 5.82 million gallons per day of water will be needed to support the habitats and maintain the perennial stream in the low-flow channel.

## Ground Water Studies and Mitigation Projects

### **The Prescott Active Management Area Baseline Monitoring Study –**

Situated in Yavapai County, the Prescott Active Management Area encompasses more than 485 square miles. (See discussion of Active Management Areas and ground water basins in Section II of this report.) This AMA is situated in both the Middle Gila and Verde watersheds. ADEQ conducted baseline monitoring in 1997-1998 to look at the heavy reliance on ground water supplies, ground water management decrees which require reaching sustainable levels (safe-yield) by 2025, a large increase in population, and the associated number of wells used to extract ground water.

The Prescott AMA consists of two sub-basins, (the Little Chino and the Upper Agua Fria), and two aquifers (the regional aquifer located in valley alluvial areas and the hardrock aquifer located in mountainous areas). Ground water quality differences were found between each sub-basin and each aquifer.

The study concluded that the 58 sites sampled in the Prescott AMA generally met water quality standards. Of the sites, 90 percent sampled met health-based standards and 85 percent met aesthetics-based standards. Aquifer protection standards were exceeded at scattered well sites and did not appear to indicate extensive areas of ground water that are unsuitable for domestic use. Fluoride and arsenic were the parameters that most frequently exceeded standards and these elevated levels appear to be the result of naturally occurring conditions.

### **Salt River Project (SRP) Ground Water Monitoring –** (See prior discussion)

SRP's 248 ground water wells help satisfy customer needs in Phoenix metropolitan area. SRP ground water is pumped from wells into canals or laterals, where mixing and dilution with surface water occurs. SRP tests for organic, inorganic constituents, and trace metals.

**Prescott Mining Project** – This EPA funded study was to characterize the impacts to surface and ground water from inactive and abandoned mines within a 500 square mile area located in the Bradshaw Mountains, Yavapai County, Arizona. The US Forest Service, the U.S. Bureau of Mines, and ADEQ cooperated in this investigation. As a result of the partnership, the project was modified to focus on inactive and abandoned mining impacts on water quality and biota in the lower Turkey Creek drainage area.

In 1994-1995, 25 sites were sampled up to three times in the lower Turkey Creek drainage area. Surface and ground water samples, geophysical surveys,



and tailings (soil) samples were collected. Samples taken directly from the tailings piles indicated extremely high levels of arsenic and lead; however, water samples taken directly below these tailings piles and downstream did not reveal elevated levels of heavy metals during the three sampling events. A previous study at the Golden Turkey Mine in 1991 (a large abandoned mine along Turkey Creek) detected exceedances for arsenic, cyanide and mercury. This Prescott Mining Study concluded that the tailings do represent a significant potential source of contamination to Turkey Creek, which may only occur during rainfall/runoff events. Further, transport of these pollutants downstream to the Agua Fria River and Lake Pleasant pose a potential threat to human health and the environment.

The report recommended that the Golden Belt and Golden Turkey mines should be the first priority for remediation in the lower Turkey Creek drainage area. Since project and equipment costs can be significant, that remedial action should be undertaken after assessments of risk is completed at other mine sites in the vicinity. Further, a study should be initiated to determine impacts of downstream migration of contaminated sediments.

**Federal and State Superfund Cleanup Sites** – Seven federal National Priority Listed Superfund sites, nineteen state WQARF Superfund sites, and three Department of Defense cleanup sites are located in the Middle Gila Watershed. **Figure 63b** illustrates the location of these sites. These impacts to the Middle Gila Watershed's ground water quality cannot be understated.

- < 19<sup>th</sup> Avenue Landfill and the Hassayampa Landfill – Two sites are landfills that have impacted ground water and soil. Volatile organic chemicals are present in the ground water beneath each landfill and other pollutants are in the soils, including petroleum products, pesticides and heavy metals.
- < North Indian Bend Wash and South Indian Bend Wash -- These two sites are the result of historical industrial operations where volatile organic chemical solvents have contaminated ground water and created large plumes, spreading beyond the points of each spill site. The ground water in the southern site is mainly contaminated with volatile organic chemicals, while soils are contaminated by VOCs cyanides, acids, and heavy metals including chromium and lead. Efforts are ongoing to remediate and remove the TCE contamination with soil vapor extraction systems, air-stripping, and ground water treatment systems.

- < Motorola 52<sup>nd</sup> Street – This National Priority List site is located in a residential and commercial area in the eastern portion of Phoenix. The major contaminant of concern is the solvent TCE, a volatile organic compound which has formed a large plume in the ground water spreading to the west. Motorola is to design and implement a ground water and soil gas treatment system. Seven other parties have received general notice letters from ADEQ under the Superfund law as potentially responsible parties. This has lead one of those to conduct a remedial investigation of various volatile organic compounds, freon, and co-mingled jet fuel near Sky Harbor Airport. At the time of this writing, ADEQ is in the process of conducting a five year-review of data collected in one portion of this site to evaluate the effectiveness of current remedial actions.
- < Luke Air Force Base, former Williams Air Force Base, and the Phoenix-Goodyear Airport north and south -- Three sites are located at either military or civilian airports. The contaminants include organic solvents and paint strippers, waste oil spills, petroleum spills, metal plating wastes, hydraulic fluids, pesticides, and radiological wastes. Contamination occurred due to historic disposal and storage practices.
- < Seventeen other sites have impacted ground water with volatile organic chemicals. The most common volatile organic chemicals in this group are: PCE (a common dry cleaning chemical) and TCE (formerly used in the computer manufacturing and other high tech industries). Some of these sites also have soil contamination, with constituents like pesticides, heavy metals and petroleum products.
- < Vulture Mill -- Investigations at the Vulture Mill shows an average concentration of lead in the mill tailings of 5,000 mg/kg (parts per million). This exceeds Arizona's soil remediation standards of 400 mg/kg on residential property and 2000 on non-residential property. The highest concentration of lead in the tailings is reported to be approximately 11,000 µg/L.
- < East Washington Fluff sites – This site is listed for lead and polychlorinated biphenyls (PCBs) above regulatory levels. ADEQ initiated an early response action for the this former auto shredder facility. Contaminated soil was removed, and clean fill and gravel was placed on top as a protective cap.

- < The Gila Bend Auxiliary Air Field -- In 1994, the US Air Force conducted site investigations of two sites at this facility: the former fire training area and a nearby maintenance area. Limited contamination was found at the former fire training area, with a determination that it did not pose a threat to ground water. Sampling of the maintenance area did not reveal any contamination warranting further action.
- < The 161<sup>st</sup> Air National Guard – Past aircraft maintenance and fueling operations at the site have led to surface and subsurface soil and ground water contamination with petroleum products and volatile organic compounds.
- < The Papago Military Reservation -- This site is listed due to jet fuel; however, the extent of contamination remains undefined.

## Watershed Partnerships

**The Upper Agua Fria Watershed Partnership** – This partnership was formed in 2000 under ADWR’s Rural Watershed Initiative. This partnership is made up of supporting federal and state agencies and stakeholder groups, including: the Bureau of Land Management, the Natural Resources Conservation Service, US Fish and Wildlife Service, US Forest Service, US Geological Survey, ADEQ, ADWR, Arizona Game and Fish Department, Arizona State Land Department, Arcosanti, Big Bug Economic Alliance, Big Bug Watershed Group, Mothers for Clean Water, Sonoran Audubon Society, Spring Valley Homeowners Association, University of Arizona and Yavapai County Water Advisory Committee.

Three key watershed issues have been identified by the partnership: water quantity, water quality, and water legal rights issues. Specific issues included the fast growth and development of the Prescott Active Management Area (AMA), ranching issues, leaking underground storage tanks, and potential MTBE pollution near Cordes Junction. The issue of diminished water quality due to illegal wildcat dumps near and in the river systems has become very important, and the partnership plans to address this issue with a Water Quality Improvement Grant in 2001 to clean up several small wildcat dump sites along the Big Bug Creek and the Agua Fria River.

The UAFWP received \$25,000 in 2000 from the ADWR and State Legislature Middle Gila Watershed

Rural Watershed Alliance Funds to conduct and compile a hydrological assessment of the Upper Agua Fria Sub-watershed (not including areas within the Prescott or Phoenix Active Management Areas). The research is being conducted by the University of Arizona’s School of Renewable Resources. The report is to be finalized in the near future.

The partnership also received \$25,000 (2001) from the Rural Watershed Alliance Funds for a ground water study by University of Arizona for the Upper Agua Fria Sub-watershed, to help augment the on-going hydrologic study already being conducted.

Recently the partnership was successful in working with ADEQ and Yavapai County to have several tons of soil with asphalt chunks removed from Big Bug Creek. This occurred because the partnership brought the recent deposit of these waste materials in Big Bug to the attention of ADEQ and Yavapai County.

For information about future meeting, contact Mary Hoadley at [earthhous@aol.com](mailto:earthhous@aol.com) or by phone at Arcosanti, Arizona (520) 632-6229.

**The Tres Rios River Management Plan Steering Committee** – The Tres Rios group was formed in 1994. The planning, design, and implementation phase of the Tres Rios Project required the cooperation of a large number of federal, state, city, and county agencies and other interested parties, including: Phoenix, the Corps of Engineers, the Bureau of Land Management, Glendale, Mesa, Phoenix, Scottsdale, Tempe and Tolleson, Arizona Municipal Water Users Association, Arizona State University, Gila River Indian Community, Greeley and Hansen, Maricopa County Flood Control District, and Science Applications International Corporation, Arizona Game and Fish Department, ADEQ, Maricopa County Department of Parks and Recreation, Maricopa County Flood Control District, and the United States Environmental Protection Agency.

The Tres Rios Project is a constructed wetland at the convergence of the Salt, Gila, and Agua Fria rivers (tres rios being Spanish for “three rivers”). It was conceived of so that the largest wastewater treatment plant serving the Phoenix metropolitan area could meet more stringent surface water quality standards and to provide additional treatment capacity. The wetlands were to provide water treatment for the 91<sup>st</sup> Avenue WWTP, create wildlife habitat, and provide for flood protection for downstream residents.

The objectives of the first phase of the Tres Rios Project were to:



- < Test the capability of constructed wetlands to treat effluent to meet the expected future National Pollutant Discharge Elimination System (NPDES) requirements,
- < Develop appropriate design criteria for a future full-scale 800-acre wetland project in the Tres Rios area, which would treat the entire 150 million gallons per day of effluent discharged by the plant, and
- < Assess the net environmental benefit it would have on the three river area.
- < Enhance wildlife habitat,
- < Provide an education and passive recreation resource for the community.

Along with the development of this constructed wetland, this interagency committee has:

- < Developed a database of existing water quality data (inorganics, organic, pesticides, PCBs, and dissolved oxygen)
- < Identified potential water quality sources of contaminants: flood flows, agricultural storm water runoff, agricultural irrigation drainage and dewatering, discharges from concentrated animal feeding operations, wastewater treatment plant discharges, landfill leachate, ground water inflow, and sand and gravel releases.
- < US Army Corps of Engineers prepared the *Tres Rios, Arizona Feasibility Study* (2000). The study focused on efforts to improve fish and wildlife habitat values and diversity for threatened and endangered species. Potential incidental benefits for flood damage reduction, water quality, water supply and recreation were also evaluated.
- < Two Geographic Information System (GIS) projects have been completed in 2001 by two private consultants to help characterize the Tres Rios area, the confluence of the Middle Gila, the Salt and the Agua Fria rivers. These GIS projects attempted to inventory the various elements that could potentially impair the rivers water quality, including NPDES permitted sites, Concentrated Animal Feeding Operations (CAFOs) and storm water inputs. These GIS projects are available on CD-ROM.

The main contact for this group is Dick Perault with the Maricopa County Flood Control District.